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FROM THE

UNITED STATES GOVERNMENT

ANNUAL REPORTS, WAR DEPARTMENT

FISCAL YEAR ENDED JUNE 30, 1916

REPORT OF THE CHIEF OF ENGINEERS U. S. ARMY

1916

IN THREE PARTS

PART 2



WASHINGTON
GOVERNMENT PRINTING OFFICE

1916

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**REPORT OF THE BOARD OF ENGINEERS
FOR RIVERS AND HARBORS**

AND

REPORTS OF DISTRICT ENGINEER OFFICERS

**ACCOMPANYING THE ANNUAL REPORT OF THE CHIEF OF
ENGINEERS, U. S. ARMY,**

FOR THE

FISCAL YEAR ENDING JUNE 30, 1916.

59091°—ENG 1916—117

1857

**REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS
FOR THE FISCAL YEAR ENDING JUNE 30, 1916.**

**WAR DEPARTMENT,
BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 20, 1916.**

From: The senior member, the Board of Engineers for Rivers and Harbors.

To: The Chief of Engineers, United States Army.

Subject: Annual report, fiscal year ending June 30, 1916.

1. The Board of Engineers for Rivers and Harbors has the honor to submit the following report of its operations during the fiscal year ending June 30, 1916. Information concerning the organization of the board and its duties as prescribed by law is given on page 39.

2. The status of the board's work at the close of the preceding fiscal year and the work accomplished during the last fiscal year under the several recent river and harbor acts are shown by the following table. All investigations ordered by prior acts have been disposed of.

Status of work of the Board of Engineers for Rivers and Harbors, fiscal year ending June 30, 1916.

	Act of—					Total.
	June 25, 1910.	Feb. 27, 1911.	July 25, 1912.	Mar. 4, 1913.	Mar. 4, 1915.	
Number of investigations by acts (all sections).....	187	90	26	122	219	844
Preliminary reports not received up to end of preceding fiscal year.....			6	3	182	191
Preliminary reports received during the year.....			5	2	164	171
Preliminary reports not received up to June 30, 1916.....			1	1	18	20
Total reports, examinations, and surveys remaining for action at end of the preceding fiscal year.....	3	3	24	19	214	263
Cases disposed of during the year.....	2	2	13	8	137	162
Cases remaining for final action on June 30, 1916.....		1	11	11	77	100

3. The following shows the aggregate amounts recommended by the board in reviewing reports on preliminary examinations and surveys ordered by acts of Congress since its organization and the proportion of the same adopted by Congress. Inasmuch as recent river and harbor acts and resolutions have provided for investigations of a number of localities covered by earlier acts and resolutions, it has been necessary to omit the earlier estimates from the totals in order to avoid duplication in some cases. In other instances recent recommendations have nullified earlier ones, and in these cases also the

former estimates have been withdrawn. This has not been possible in all cases, however, as the more recent recommendations sometimes overlap the earlier ones in such a way as to render it difficult or impossible to make the proper deductions. The amounts, therefore, do not agree precisely with those given in previous statements:

	Estimated cost of projects recommended by board.	Estimated cost of projects adopted by Congress.
Act of—		
June 13, 1902.....	\$11,203,980.25	\$7,446,000.25
Mar. 2, 1905.....	¹ 93,052,900.36	92,885,849.56
June 28, 1906.....	168,300.00	168,300.00
Mar. 2, 1907.....	² 48,206,733.44	47,259,685.44
Mar. 3, 1909.....	³ 83,434,984.34	57,540,998.06
June 25, 1910.....	⁴ 17,540,418.50	9,624,818.50
Feb. 27, 1911 (incomplete).....	10,541,972.70	8,025,739.70
July 25, 1912 (incomplete).....	⁵ 21,647,490.00	4,865,436.00
Mar. 4, 1913 (incomplete).....	10,056,720.00	
Mar. 4, 1915 (incomplete).....	⁶ 24,082,563.00	
Total.....	319,924,101.59	227,796,514.51

¹ Includes \$63,731,500 for improvement of Ohio River to a depth of 9 feet.

² Includes \$20,000,000 for Missouri River and \$7,430,000 for Jamaica Bay, New York.

³ Includes \$10,926,000 for Delaware River; \$13,400,000 for East River; \$5,186,064 for Hudson River; \$8,806,048 for Tennessee River; \$13,303,587 for sections of the Intracoastal Waterway from Boston to Beaufort Inlet.

⁴ Includes \$4,760,000 for waterway from Lookport, Ill. to St. Louis, Mo.

⁵ Includes \$7,076,600 for Merrimack River.

⁶ Includes \$19,000,000 for Tennessee River at Muscle Shoals, which also replaces part of project recommended under 1909 act.

4. Similar figures for improvements recommended by the board since its organization as a result of investigations made in compliance with resolutions of the Committee on Rivers and Harbors of the House of Representatives and the Committee on Commerce of the Senate are as follows:

Fiscal year.	Estimated cost of projects recommended by board.	Estimated cost of projects adopted by Congress.
1904.....	\$886,000	\$886,000
1905.....	¹ 8,550,000	8,550,000
1906.....		
1907.....	² 11,506,887	11,506,887
1908.....	433,000	433,000
1909.....	2,119,000	2,119,000
1910.....	1,387,030	1,387,030
1911.....	355,000	355,000
1912.....	³ 3,905,000	3,905,000
1913.....	⁴ 5,872,500	
1914.....	⁵ 5,000,800	
1915.....	200,000	
1916.....	183,000	
Total.....	40,398,187	29,141,887

¹ Includes \$4,500,000 for Black Rock Harbor, N. Y.

² Includes \$6,200,000 for St. Marys Falls Canal, Mich.

³ Includes \$3,526,600 for harbor of refuge at Cape Lookout, N. C.

⁴ Includes \$5,880,000 for improvement of Sacramento River by California Debris Commission.

⁵ Does not include \$18,701,000 for Tennessee River at Muscle Shoals, Ala. Improvement of this locality, at an estimated cost of \$19,000,000, recommended under 1915 act.

5. The above figures indicate that out of \$360,322,288.59 recommended by the board since its organization, Congress has adopted projects estimated to cost \$256,938,701.51, or about 71 per cent. This

percentage is smaller than reported last year, but no new projects have been adopted by Congress during the last three fiscal years. The following shows the number of favorable and unfavorable reports submitted by the board on investigations called for by Congress:

Authority for investigation.	Investigations ordered.	Reported on to June 30, 1916.	Favorable.	Unfavorable.	Per cent of favorable reports.	Remarks.
Act of—						
June 13, 1902.....	170	170	52	118	30.6	
Mar. 3, 1905.....	176	176	74	102	42.0	
June 28, 1906.....	2	2	1	1		
Mar. 2, 1907.....	200	200	105	92	54.0	
May 28, 1908.....	1	1	1			
Mar. 8, 1909.....	274	274	120	154	43.8	
June 25, 1910.....	187	187	63	125	33.7	
Feb. 27, 1911.....	90	89	28	61	31.5	
July 25, 1912.....	226	215	70	145	32.5	
Mar. 4, 1913.....	122	111	40	71	36.1	
Mar. 4, 1915.....	219	142	22	120	14.0	
Resolutions, fiscal year—						
1904.....	13	13	5	8		
1905.....	6	6	4	2		
1906.....	4	4	1	3		
1907.....	26	26	13	13		
1908.....	7	7	3	4		
1909.....	14	14	5	9		
1910.....	15	15	7	8		
1911.....	9	9	2	4		No recommendation regarding worthiness in 2 cases; reduction in 1 case.
1912.....	5	5	3			No recommendation regarding worthiness in 2 cases.
1913.....	12	12	2	6		No recommendation regarding worthiness in 4 cases.
1914.....	14	14	5	2		No recommendation regarding worthiness in 7 cases.
1915.....	4	4	1	3		
1916.....	8	6	2	1		No recommendation regarding worthiness in 3 cases.
Total.....	1,794	1,702	632	1,052	37.1	

6. From its investigations during the year the board finds that the general interest in the improvement of rivers and harbors has continued, resulting in occasional offers of cooperation by local interests. This cooperation has taken a number of forms, including donations of rights of way, cash contributions, and in some instances merely the provision of terminal facilities. The last named is not infrequently made a condition in order that the full benefit of the improvement may be realized. There are many cases where, in addition to the general public benefits to be derived from improvements, local interests will obtain substantial direct benefits from the proposed work, and in such cases the board has felt that the interests immediately benefited should share in the expense involved. Its recommendations in cases of this kind have been instrumental in effecting large savings to the General Government, and have enabled some communities to enjoy the benefits of improved navigation facilities, when, without their active cooperation, the improvements would not have been justified.

7. In compliance with resolutions of the Committee on Commerce and the Committee on Rivers and Harbors, and under instructions from the Chief of Engineers, United States Army, the board con-

sidered and reported its conclusions on the following subjects during the last fiscal year:

Lake Superior to Mississippi River, waterway.
 Tennessee River, above Chattanooga, and between Chattanooga and Browns Island.
 Monterey Harbor, Cal.
 Savannah River at Augusta, Ga.
 Pollock Rip Channel, Nantucket Sound, Mass.
 New York Bay to Gulf of Mexico, waterway (Senate resolution).

8. The act of March 4, 1915, contained provision for 209 examinations in section 15 and 10 reexaminations of projects in section 14. The latter section also directs the Chief of Engineers "to make a report upon any other projects, river or harbor, the further improvement of which under present conditions is undesirable, or in which modifications of the plans or projects should be made." Under this authority the board has reviewed the projects for improvement at 125 localities, and has recommended the abandonment of 32 projects, including the abandonment of parts of 2 projects and the modification of 22 projects. Action on 6 of the 10 reexaminations specifically ordered in section 14 has resulted in recommendations for the modification of 5 projects.

9. In connection with the various subjects referred to it for report and recommendation, the board held public hearings and made inspections as follows:

Place of hearing or inspection.	Date.	Subject.
	1915.	
Port Henry, N. Y.....	July 8.....	Port Henry Harbor.
Norwich, Conn.....	July 22.....	Thames River, between New London and Norwich.
Kansas City, Mo.....	Oct. 19-20.....	Missouri River, from Kansas City to the mouth.
Little Rock, Ark.....	Nov. 16.....	Arkansas River.
Shreveport, La.....	Nov. 17.....	Red River.
	1916.	
Augusta, Ga.....	Mar. 24.....	Savannah River at Augusta, and between Augusta and Savannah.

10. During the year 46 hearings to interested persons were given at the office of the board in relation to the following subjects:

Date.	Subject.	Date.	Subject.
1915.		1916.	
Sept. 14	Housatonic River, Conn.	Feb. 23	Taylor's Bayou, Tex.
14	St. Marys River, Ga.	23	Sabine-Neches Canal, Tex.
28	South Fork, Edisto River, S. C.	23	Yaquina Bar, Bay, and Harbor, Oreg.
Oct. 26	Morris Cove, New Haven Harbor, Conn.	23	Monterey Bay, Cal.
Nov. 23	Newport News to York River, Va.	Mar. 7	Ouachita River, La. and Ark.
28	Savannah River at Augusta, Ga.	7	Texas City Channel, Tex.
23	West Creek, N. J.	7	Indiana Harbor, Ind.
Dec. 7	Pugaley Creek, N. Y.	7	Galena River, Ill.
7	Little Wicomico River, Va.	21	Courtableau Bayou, La.
21	Nanjemoy Creek, Md.	21	Guadalupe River, Tex.
21	Arkansas River at Bradens Bend.	21	Colorado River, Tex.
21	Illinois Waterway.	Apr. 11	Rainy Lake, Minn.
1916.		11	White Oak River, N. C.
Jan. 11	San Diego Harbor, Cal.	12	Makka River, Fla.
11	Clatskanie River, Oreg.	12	Anacortes Harbor, Wash.
11	Coquille River, Oreg.	25	Muskegon River, Mich.
11	Cocos Bay and Bar, Oreg.	May 9	Harbor of Refuge on North Shore of Long Island.
11	Willamette River, Oregon City to Eugene.	23	Merrimac River, Mass.
11	Oswego Harbor, N. Y.	23	Snake River and Nome Harbor, Alaska.
25	St. Lucie Inlet, Fla.	23	Portland Harbor, Me.
26	Ventura Harbor, Cal.	June 6	Youghiogheny River, Pa.
Feb. 8	Galena River, Ill.	20	Vermillion Harbor, Ohio.
8	Guadalupe River, Tex.	20	Sabine-Neches Canal, Tex.
		20	Sammamish River, Wash.

11. Expenses of the board during the fiscal year may be briefly summarized as follows:

Rent of offices	\$2, 870. 00
Salaries of civilian assistants	9, 660. 00
Mileage, traveling expenses, etc	7, 685. 18
Miscellaneous	941. 73
Total	20, 906. 91

For the board:

FREDERIC V. ABBOT,
Colonel, Corps of Engineers,
Senior Member of the Board.

IMPROVEMENT OF RIVERS AND HARBORS IN THE PORTLAND, ME., DISTRICT.

REPORT OF MAJ. F. A. POPE, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. St. Croix River, Me.....	1865	7. Georges River (Thomaston Har-	1869
2. Breakwater from Mount Desert		bor), Me.....	1870
to Porcupine Island (Bar Har-		8. Kennebec River, Me.....	1870
bor), Me.....	1866	9. Portland Harbor, Me.....	1872
3. Bass Harbor Bar, Me.....	1867	10. Saco River, Me.....	1872
4. Deer Island Thoroughfare, Me.	1867	11. Harbor at Isles of Shoals, Me.	1872
5. Penobscot River, Me.....	1868	and N. H.....	1873
6. Rockland Harbor, Me.....	1868	12. Pepperells Cove, Me.....	1873

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 42 TO 65.

1. ST. CROIX RIVER, ME.

A contract was made for all the dredging necessary to completion of the project. The work included the upper end of the middle section and all of the upper section, a total channel length of about 2,000 feet. Dredging was commenced October 28, 1915, suspended December 7, and resumed April 24, 1916. The total quantity of material taken out by the close of the fiscal year was 50,478 cubic yards, and the work was carried on in continuation of the channel upstream. About 900 feet were added to the length of improved channel as a result of the operations during the year. About 1,100 linear feet of channel 100 feet wide, and 9 feet deep at mean low tide, are yet to be excavated to complete the project.

APPROPRIATIONS.

Previous projects (see p. 542, H. Doc. 1491, 63d Cong., 3d sess.).....	\$5,000
Present project:	
June 25, 1910.....	\$75,000
Mar. 4, 1913.....	75,000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	50,000
	<hr/> 200,000
Total	205,000

CONTRACT IN FORCE.

Eastern Dredging Co., for dredging about 69,200 cubic yards.

Prices: 53.83 cents per cubic yard for dredging, \$10 per cubic yard for removing boulders exceeding 2 cubic yards and not exceeding 5 cubic yards each.

Approved September 18, 1915, to be commenced by October 25, 1915, and completed by August 25, 1916.

Completed to June 30, 1916: 73 per cent.

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons.
Coal	103, 879
Fertilizer	5, 098
General merchandise	7, 191
Lumber	29, 023
Provisions	125
Pulp wood	1, 350
Wool and hides	88
Total	146, 754

Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers, draft about 10 feet	600
Sailing vessels, draft about 10 feet	296
Barges, draft about 10 feet	8

2. BREAKWATER FROM MOUNT DESERT TO PORCUPINE ISLAND, BAR HARBOR, ME.

Except for a period of suspension during the winter, delivery of stone in the breakwater, under contract with P. H. Doyen Co., was continued until May 31, 1916, when a strike in the quarries made it impracticable to secure stone, and an additional temporary suspension became necessary. The stone placed during the fiscal year amounted to 22,885 tons of 2,000 pounds, with which the breakwater was extended about 69 linear feet, or to its full projected length. The slopes are not to full section, and a few thousand tons of stone are still needed for completion of the work.

APPROPRIATIONS.

Present project:

Aug. 11, 1888	\$50, 000. 00
Sept. 19, 1890	50, 000. 00
July 13, 1892	50, 000. 00
June 23, 1894 (claim)	6, 391. 12
Aug. 18, 1894	10, 000. 00
June 3, 1896	10, 000. 00
Mar. 3, 1899	20, 000. 00
Mar. 2, 1907	30, 000. 00
June 25, 1910	25, 000. 00
Feb. 27, 1911	30, 000. 00
Aug. 24, 1912	75, 000. 00
June 23, 1913	70, 200. 00
Total	428, 591. 12

CONTRACT IN FORCE.

BREAKWATER CONSTRUCTION.

P. H. Doyen Co., for about 83,077 tons of stone.

Price: 77½ cents per short ton in place.

Approved February 16, 1914, to be commenced at once and completed by November 30, 1914 (waived).

The total quantity of stone delivered is 84,780 tons. About 12,000 tons additional will be needed for completion of the breakwater.

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons.
Coal, anthracite	10, 410
Coal, bituminous	756
General merchandise	12, 885
Grain and flour	1, 920
Pipe	50
Sand and stone	10, 250
Wood	3, 184
Total	39, 455

Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers, average draft 12 feet	2, 660
Sailing vessels, average draft 7 feet	151
Barges	12
Number of passengers arriving and departing by water	92, 715

3. BASS HARBOR BAR, ME.

There was no work during the year. Expenditures were for office expenses. The improvement is under supervision, and an examination will be made to determine whether or not more work will be necessary.

APPROPRIATIONS.

Present project, Mar. 4, 1913..... \$10, 000

COMMERCIAL STATISTICS.

There are no records of the vessels using the passage across the bar. The locality is somewhat remote. The light keeper reports that the vessels all use the passage that was cleaned out. The steamship people state that many vessels are using the channel, and it is understood that this route is generally taken advantage of, excepting deep-draft vessels and steamers, which reach the bar at low water, at which time they are obliged to go around. It is impracticable to satisfactorily express the safety due to the cleaning out and deepening of the channel.

4. DEER ISLAND THOROUGHFARE, ME.

The contractor continued the work of removing shoals over which grade had not been secured by earlier operations. The contract, which covered all the work proposed by the project, was completed July 22, 1915.

The improvement, which consisted in rock excavation, involved the removal of 2,339 cubic yards of material, measured in place.

APPROPRIATION.

Present project, Mar. 4, 1913..... \$40, 000

CONTRACT IN FORCE.

Eastern Dredging Co., for excavating 2,181 cubic yards of rock.
 Price: \$14.50 per cubic yard, place measurement.
 Approved February 6, 1914, to be commenced by April 1, 1914, and completed by July 31, 1915.
 Completed.

COMMERCIAL STATISTICS.

It has been impracticable to secure statistics for the calendar year 1915. The local tonnage amounts to about 215,000 tons, chiefly granite.

5. PENOBSCOT RIVER, ME.

There was no work. Expenditures were for office expenses, etc.

APPROPRIATIONS.

Previous projects (p. 524, H. Doc. 1491, 63d Cong., 3d sess.)	\$376, 300
Present project, Mar. 2, 1907	130, 000
Total	506, 300

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons.		Short tons.
Apples	5	Leather and hides	1, 600
Bricks and clay	190	Oil	14, 452
Cement and lime	9, 394	Potatoes	650
Coal, anthracite	324, 229	Pulp wood	2, 400
Coke	1, 514	Salt	3, 702
Fertilizer	12, 721	Sheathing paper	128
Fish	1, 055	Sand and stone	33, 980
General merchandise	22, 652	Tar and pitch	349
Grain	150	Wood	150
Hay and straw	35		
Iron, steel, and machinery	4	Total	432, 436
Lumber and cooperage	3, 076		

Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers:	
Coastwise, average draft 15 feet	913
Coastwise, average draft 7 feet	1, 600
Sailing vessels:	
Coastwise, average draft 15 feet	292
Coastwise, average draft 7 feet	500
Barges, average draft 15 feet	123
Number of passengers arriving and departing by water	51, 850

6. ROCKLAND HARBOR, ME.

There was no work beyond supervision. Expenditures were for office expenses.

APPROPRIATIONS.

Present project:

June 14, 1880.....	\$20,000	Aug. 18, 1894.....	\$80,000
Aug. 2, 1882.....	40,000	June 3, 1896.....	25,500
July 5, 1884.....	40,000	June 4, 1897.....	350,000
Aug. 5, 1886.....	22,500	July 1, 1898.....	800,000
Aug. 11, 1888.....	80,000		
Sept. 19, 1890.....	37,500	Total.....	925,500
July 13, 1892.....	30,000		

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons
Cement, lime, sand, and brick.....	52,040
Coal.....	162,187
Fertilizer.....	29,088
Fish, lobsters, and scallops.....	3,500
Granite.....	85,465
General merchandise.....	100,000
Ice.....	12,000
Lime rock and plasters.....	8,263
Lumber and cooperage.....	74,140
Oil.....	6,750
Potatoes.....	1,125
Salt.....	1,369
Wood, pulp and piling.....	16,275
Total.....	552,182

Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers and motor boats, average draft 14 feet.....	11,025
Sailing vessels, average draft 14 feet.....	1,614
Number of passengers landing and departing by water.....	112,740
Vessels built during the year, gross tons 200.....	9

7. GEORGES RIVER (THOMASTON HARBOR), ME.

There were no operations and no expenditures. Funds for restoring channel conditions have been provided by the river and harbor act of July 27, 1916.

APPROPRIATIONS.

Present project:

June 3, 1896.....	\$10,000
Mar. 3, 1899.....	10,000
June 13, 1902.....	6,000
July 27, 1916.....	10,000
Total.....	36,000

COMMERCIAL STATISTICS.

Receipts and shipments.

Short tons.	Short tons.
Bricks and clay..... 100	Ice..... 50
Canned goods..... 25	Lumber and cooperage..... 63
Lime..... 3,400	Provisions..... 150
Coal, anthracite..... 3,500	Sand and stone..... 600
Coal, bituminous..... 4,000	Wood..... 600
Fish..... 500	
General merchandise..... 200	Total..... 13,188

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Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers, average draft 15 feet.....	2,986
Sailing vessels, average draft 15 feet.....	80
Barges, average draft 15 feet.....	18
Number of passengers arriving and departing by water.....	6,000

8. KENNEBEC RIVER, ME.

There were no operations. Expenditures were for office expenses.

APPROPRIATIONS.

Previous projects (p. 472, H. Doc. 1491, 63d Cong., 3d sess.).....	\$592,445.71
Present project:	
Mar. 2, 1907.....	\$75,000.00
May 27, 1908.....	86,500.00
Mar. 4, 1909.....	70,000.00
June 25, 1910.....	43,500.00
Mar. 4, 1913.....	30,500.00
	<hr/> 305,500.00
Total.....	897,945.71
Returned to surplus fund.....	2,034.68
	<hr/>
Net total.....	895,911.03
Receipts from sales.....	5.05
	<hr/>
Grand total.....	895,916.08

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons.		Short tons.
Bricks and clay.....	3,000	Lumber.....	65,000
Cement and lime.....	3,500	Provisions.....	1,000
Coal, anthracite.....	75,000	Pulp wood.....	16,200
Coal, bituminous.....	40,000	Sand and stone.....	6,000
Fertilizer.....	5,000	Wood.....	3,750
General merchandise.....	17,000		
Hay and straw.....	500	Total.....	275,950
Ice.....	40,000		

Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers, average draft 16 feet.....	3,200
Sailing vessels, average draft 16 feet.....	300
Number of vessels built during the year, wood, with a total gross tonnage of 6,337 tons.....	5
Number of steel vessels built during the year with a total gross tonnage of 3,471 tons.....	3
Number of passengers landing and departing by water during the calendar year.....	559,375

9. PORTLAND HARBOR, ME.

At the beginning of the fiscal year 1916 dredging was in progress under a contract with Eastern Dredging Co. for restoring the 12-foot depth in the channel in Back Cove, the total channel length being about 5,000 feet and the width 300 feet. About two-thirds of

this area had been completed. Dredging was continued, and the work was completed November 5, 1915. The total quantity of material excavated was 313,287 cubic yards, of which 147,312 cubic yards represent the work during the fiscal year 1916. The price was 11.88 cents per cubic yard, scow measurement.

The only remaining item for completion of the project consisted in dredging the remainder (about 16 per cent) of the anchorage area, to a depth of 30 feet at mean low tide. This was commenced July 8, 1915, under a contract with Coastwise Dredging Co., and was completed on the 18th of the following October. The total material excavated was 354,346 cubic yards, scow measurement. The contract price was 7.74 cents per cubic yard.

APPROPRIATIONS.

Previous projects (p. 529, H. Doc. 1491, 63d Cong., 3d sess.)	-----	\$1, 522, 727. 05
Present project:		
July 25, 1912	-----	\$100, 000. 00
Mar. 4, 1913	-----	150, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)	-----	105, 000. 00
Mar. 4, 1915 (allotted Apr. 2, 1915)	-----	105, 000. 00
		<hr/> 460, 000. 00
Total	-----	1, 982, 727. 05
Receipts from sales	-----	9. 44
		<hr/>
Grand total	-----	1, 982, 736. 49

CONTRACTS IN FORCE.

Eastern Dredging Co., for dredging about 200,000 cubic yards from Back Cove Channel.

Price, 11.88 cents per cubic yard.

Approved January 9, 1915, to be commenced by March 1, 1915, and completed by December 31, 1915.

Completed.

Coastwise Dredging Co., for dredging about 360,000 cubic yards in completion of the anchorage area.

Prices, 7.74 cents per cubic yard for dredging, \$10 per cubic yard for removing bowlders exceeding 2 cubic yards and not exceeding 5 cubic yards each in volume.

Approved June 22, 1915, to be commenced by July 29, 1915, and completed by March 29, 1916.

Completed.

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons.		Short tons.
Apples	11, 536	Grain and flour	465, 766
Asbestos fiber	4, 903	Iron, steel, and machinery	3, 834
Bricks and clay	11, 354	Leather and hides	3, 676
Brimstone	58, 773	Lumber and cooperage	43, 639
China clay	34, 811	Oil and oil cakes	103, 683
Canned goods	3, 243	Ore, copper	93, 896
Cattle and horses	6, 065	Paper and rags	3, 171
Cement and lime	1, 250	Provisions	48, 835
Coal, anthracite	368, 751	Pulp and pulp wood	97, 978
Coal, bituminous	1, 151, 822	Salt	7, 728
Cotton and cotton goods	1, 335	Sand and stone	5, 832
Fertilizer	1, 200		
Fish	17, 677	Total	<hr/> 2, 960, 076
General merchandise	489, 316		

Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers:

Foreign, draft from 15 to 33 feet.....	440
Coastwise—	
Average draft 19 feet.....	1, 166
Average draft 16 feet.....	2, 744
Average draft 14 feet.....	4, 922
Average draft 8 feet.....	23, 700

Sailing vessels:

Foreign—	
Average draft 18 feet.....	112
Average draft 14 feet.....	18
Coastwise—	
Draft from 17 to 19 feet.....	178
Draft from 10 to 14 feet.....	50
Barges, draft from 16 to 27 feet.....	432

Two hundred and twenty-nine small fishing boats, averaging 4 round trips per week, draft from 3 to 5 feet.

A ferryboat running from Portland to South Portland made 29 round trips per day for 300 days during calendar year 1915.

Passengers arriving and departing by water, 1,711,502.

10. SACO RIVER, ME.

There was no work during the year. Expenditures were for office expenses.

APPROPRIATIONS.

Previous projects:

1824 (not mentioned in appropriation acts).....	\$5, 000. 00
Page 540, House Document No. 1491, Sixty-third Congress, third session.....	346, 775. 00
	<u>\$351, 775. 00</u>

Present project:

June 25, 1910.....	80, 000. 00
Feb. 27, 1911.....	25, 000. 00
	<u>55, 000. 00</u>

Total.....	406, 775. 00
Carried to surplus fund (1867).....	3. 25
	<u>406, 771. 75</u>

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons.
Coal, anthracite.....	25, 368
Coal, bituminous.....	40, 290
Lumber and cooperage.....	110
Total.....	<u>65, 708</u>

Arrivals and departures during calendar year ending Dec. 31, 1915.

Sailing vessels, coastwise, draft 12½ feet.....	5
Barges, draft 12½ feet.....	56
Number of passengers arriving and departing by water.....	12, 000

11. HARBOR AT ISLES OF SHOALS, ME., AND N. H.

The only operations consisted in repair of the breakwater, which had been damaged by storms during the winter of 1913-14. The

work was done during July and August of 1915, and in accomplishing it 3,572 tons of stone were placed in the breakwater. The stone was purchased in open market, and cost, placed in the work, \$1.10 per ton for 2,147 tons deposited from lighter, and \$1.90 per ton for 1,425 tons which had to be handled by a derrick placed on shore.

APPROPRIATIONS.

Previous projects (p. 470, H. Doc. 1491, 63d Cong., 3d sess.)	\$44, 000. 00
Present project:	
June 25, 1910	\$40, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)	5, 000. 00
	<hr/> 45, 000. 00
Total	89, 000. 00
Returned to surplus fund	2, 546. 79
	<hr/>
Net total	86, 453. 21

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons.
Coal, anthracite	300
Coal, bituminous	350
Fish	1, 000
Grain and flour	75
Ice	400
Provisions	100
	<hr/>
Total	2, 225

Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers, average draft 8 feet	500
Sailing vessels, average draft 8 feet	3, 000
Number of passengers arriving and departing by water	6, 755

12. PEPPERELLS COVE, ME.

The contractor for the rock excavation necessary to completion of the project continued the work, which had been in progress since June 16, 1914, and completed it March 31, 1916. The operations for the fiscal year included securing grade over many places where earlier operations had failed to give the required depth. The shoals were so irregular that it is impracticable to express the work for the year in contract units. The entire quantity of rock removed under the contract amounted to 7,592.23 cubic yards, place measurement. The price was \$10 per cubic yard.

APPROPRIATIONS.

Present project:	
June 25, 1910	\$60, 000
Feb. 27, 1911	85, 000
Mar. 4, 1913	63, 400
	<hr/>
Total	158, 400

CONTRACT IN FORCE.

Eugene Breyman, for 7,584 cubic yards of rock excavation.

Price: \$10 per cubic yard, place measurement.

Approved January 20, 1914, to be commenced by April 1, 1914, and completed by July 31, 1915. (Waived.)

Completed March 31, 1916.

COMMERCIAL STATISTICS.

Receipts and shipments.

	Short tons.
Bricks-----	11,250
Coal, anthracite-----	110,500
Coal, bituminous-----	366,500
Fish-----	347
Lumber-----	1,250
Stone-----	600
Total-----	490,447

Arrivals and departures during calendar year ending Dec. 31, 1915.

Steamers:	
Draft about 27 feet-----	191
Draft 10 to 18 feet-----	388
Sailing vessels:	
Draft about 27 feet-----	3,802
Draft 10 to 18 feet-----	7,204
Number of passengers arriving and departing by water-----	714,001

IMPROVEMENT OF RIVERS AND HARBORS IN THE BOSTON, MASS., DISTRICT.

REPORT OF COL. W. E. CRAIGHILL, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Newburyport Harbor, Mass....	1875	8. Mystic and Malden Rivers and	
2. Merrimack River, Mass.....	1876	Mystic River below mouth	
3. Harbor of Refuge at Sandy		of Island End River, Mass..	1884
Bay, Cape Ann, Mass.....	1877	9. Boston Harbor, Mass.....	1890
4. Gloucester Harbor, Mass.....	1878	10. Dorchester Bay and Neponset	
5. Beverly Harbor, Mass.....	1880	River, Mass.....	1900
6. Salem Harbor, Mass.....	1882	11. Weymouth River, Mass.....	1903
7. Lynn Harbor, Mass.....	1883	12. Plymouth and Provincetown	
		Harbors, Mass.....	1905

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 65 TO 112.

1. NEWBURYPORT HARBOR, MASS.

During the fiscal year a survey, at a cost of \$600, allotted from the appropriation for examinations, surveys, and contingencies of rivers and harbors, was made to determine the action of the jetties in causing increased depth over the bar, and \$19.53 was expended for engineering expenses.

APPROPRIATIONS.

June 14, 1880.....	\$50,000.00	June 13, 1902.....	\$30,000.00
Mar. 3, 1881.....	40,000.00	Mar. 3, 1905.....	30,000.00
Aug. 2, 1882.....	40,000.00	June 25, 1910.....	50,000.00
July 5, 1884.....	40,000.00	Mar. 4, 1913.....	25,000.00
Aug. 5, 1886.....	37,500.00	July 27, 1916.....	20,000.00
Aug. 11, 1888.....	25,000.00		
Sept. 19, 1890.....	25,000.00	Total.....	493,500.00
July 13, 1892.....	20,000.00	Damages recovered from	
Aug. 18, 1894.....	20,000.00	failing contractor.....	795.31
June 3, 1896.....	16,000.00		
Mar. 3, 1899.....	25,000.00	Grand total.....	494,295.31

COMMERCIAL STATISTICS.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	214,080	145,808	174,548	181,221
Naphtha.....	30	270	270	261
Petroleum products.....	1,708	1,974	2,246	1,711
Staves.....	1,483			
Timber.....				235
Total.....	217,301	148,047	177,064	183,428

Vessel classification, 1915.

Class.	American.	Total net registered tonnage.
Registered sailing vessels and barges	139	99,814

Freight traffic.

Articles.	Short tons.	Value.
Coal.....	171,030	\$894,486.00
Oil.....	2,807	67,994.24
Total.....	173,837	962,480.24
Ties.....	532	(¹)
Tile pipe.....	518	(¹)
Total tonnage.....	174,887	.....

¹ Not ascertainable.

Of this freight, 89,529 short tons were reshipped to points on Merrimack and Powow Rivers in 1915.

2. MERRIMACK RIVER, MASS.

No work was done during the year. The expenditure of \$32.68 was for office expenses in connection with an application for approval of plans for a new bridge.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 485).....	\$255,866.72
Existing project:	
Mar. 3, 1899.....	\$40,000.00
June 13, 1902.....	40,000.00
Mar. 3, 1905.....	40,000.00
Mar. 3, 1909 (allotment Mar. 30, 1909).....	10,000.00
June 25, 1910.....	10,000.00
Mar. 4, 1913.....	10,000.00
July 27, 1916.....	10,000.00
	160,000.00
Total of appropriations.....	415,866.72
Carried to surplus fund in 1835, previous projects.....	900.00
Net total.....	414,466.72
Receipts from sales, existing project.....	2.08
Grand total.....	414,468.80

COMMERCIAL STATISTICS.

ABOVE NEWBURYPORT.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Cement.....			1,617	
Coal.....	104,653	83,896	92,249	86,290
Stone.....	1,483		9,055	
Petroleum products.....	2,580	2,815	2,733	2,260
Miscellaneous.....			2,915	
Total.....	108,686	86,651	108,669	88,550

Vessel classification, 1915.

Classes.	American.	Total net registered tonnage.
Registered barges.....	13	6,316

Freight traffic.

Articles.	Short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile (gross ton).
			Miles.	
Coal.....	<div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; padding-left: 5px; margin-right: 5px;"> 6,194 3,614 357 3,925 71,151 2,634 1,654 </div> <div style="margin-left: 5px;"> \$490,342.00 </div> </div>		<div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; padding-left: 5px; margin-right: 5px;"> 5 6 10 9 16 13 16 </div> <div style="margin-left: 5px;"> 1 0 0 2 2 0 1 </div> </div>	<div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; padding-left: 5px; margin-right: 5px;"> \$0.020 .050 .035 .028 .022 .027 .016 </div> </div>
Oil.....		40,313.25		
Total.....	89,529	530,655.25		

¹ There is also a 25-cent per ton transferring charge at Newburyport.

3. HARBOR OF REFUGE AT SANDY BAY, CAPE ANN, MASS.

During the fiscal year, under contract with the Breakwater Co. and its successor, the Coast & Lakes Contracting Corporation, 97 feet of superstructure, of the latest type of cross section, were built on the southern arm (see cross section C, sheet 2, Annual Report for 1911, pp. 1168-2), at an expenditure of \$48,688.96. Under the same contract, 628 tons of rubblestone were deposited in repair of the apron, at an expenditure of \$1,369.04. Under written proposal and acceptance, 3,691 tons of rubblestone were deposited in repair of the apron of the superstructure completed under a former contract, at an expenditure of \$7,288.77. Unit prices, \$1.95 per ton for stone weighing not less than 10 tons and \$1.75 per ton for stone weighing not less than 5 tons.

APPROPRIATIONS.

July 5, 1884.....	\$100,000	Mar. 2, 1907.....	\$100,000
Aug. 5, 1886.....	100,000	May 27, 1908.....	25,000
Aug. 11, 1888.....	100,000	Mar. 4, 1909.....	75,000
Sept. 19, 1890.....	150,000	June 25, 1910.....	100,000
July 13, 1892.....	150,000	Feb. 27, 1911.....	100,000
Aug. 18, 1894.....	150,000		
June 3, 1896.....	150,000	Total.....	1,950,000
Mar. 3, 1899.....	250,000	Receipts from sales.....	1
June 13, 1902.....	200,000		
Mar. 3, 1905.....	100,000	Total.....	1,950,001
June 30, 1906.....	100,000		

CONTRACT IN FORCE.

Contractor: The Breakwater Co., Philadelphia, Pa. (Coast & Lakes Contracting Corporation, New York, N. Y., successor.)

Character and amount: Superstructure of breakwater.

Unit prices (per ton of 2,000 pounds): For capstones, \$7.23; for all other wall stones, \$5.73; for rubblestone of class A, \$1.90; for rubblestone of class B, \$2.18.

Date of contract: April 26, 1911.

Date of approval: May 8, 1911.

Date fixed for commencement: Within 20 days after date of receipt of notification of approval.

Date fixed for completion: November 30, 1912. (Time limit waived.)

Contract completed: August 23, 1915.

4. GLOUCESTER HARBOR, MASS.

Under contract with John J. Fitzpatrick & Sons, drilling, blasting, and dredging of blasted material were in progress on ledges G and H until December 9, 1915, when work was suspended for the winter. (For location of these ledges by letter see map accompanying H. Doc. No. 1112, 60th Cong., 2d sess.) At the close of the fiscal year work had not been resumed.

APPROPRIATIONS.

Act.	Previous projects.	Existing project.			Total.
		Dredging and rock removal.	Breakwater.	Ledge removal.	
1823-1886 (see H. Doc. 1491, 63d Cong., 3d sess., p. 457)	\$21,000.00				\$21,000.00
Aug. 11, 1888		\$10,000.00			10,000.00
Sept. 19, 1890		15,000.00			15,000.00
July 13, 1892		40,000.00			40,000.00
Aug. 16, 1894			\$40,000.00		40,000.00
June 3, 1896			32,318.35		34,000.00
Mar. 3, 1899	1,681.65		40,000.00		40,000.00
June 13, 1902			75,000.00		75,000.00
Mar. 3, 1903			60,000.00		60,000.00
Apr. 28, 1904			100,000.00		100,000.00
Mar. 3, 1905			50,000.00		50,000.00
June 30, 1906			17,083.00		17,083.00
June 25, 1910				\$25,000.00	25,000.00
Feb. 27, 1911			15,000.00		15,000.00
Total	22,681.65	65,000.00	429,401.35	25,000.00	542,083.00

CONTRACT IN FORCE.

Contractor: John J. Fitzpatrick & Sons, Plattsburg, N. Y.

Character and amount: For 2,206 cubic yards rock excavation in Gloucester Harbor.

Unit price: \$8.88 per cubic yard.

Date of contract: January 19, 1912.

Date of approval: February 3, 1912.

Date fixed for commencement: Not later than May 1, 1912.

Date fixed for completion: On or before December 31, 1912. (Time limit waived.)

Percentage of completion at end of fiscal year: 83.

COMMERCIAL STATISTICS.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	49,924	29,235	87,311	78,982
Lumber.....	3,085	3,517	144	140
Brick.....	1,000	6,750		
Stone, sand, and gravel.....		6,400		533
Oil.....	990	1,041	4,932	402
Salt.....	28,539	41,062	26,271	26,780
Fish and fish products.....	106,054	102,320	103,273	101,063
Wood.....	2,343	1,185	1,970	1,806
Sugar.....		35		
Molasses.....		8	1	
Plaster.....	170			
Ballast.....	400		400	400
Miscellaneous.....	32,728	32,175	30,100	30,249
Total.....	223,533	217,763	254,421	239,584
Number of passengers carried.....	42,000	38,165	37,165	29,165

¹ Incomplete.

Vessel classification, 1915.

Classes.	Amer- ican.	Foreign.	Total.	Total net registered tonnage.	Passen- gers.
Registered:					
Steamers.....	657	4	661	194,066	31,352
Sailing vessels.....	1,912	81	1,993	164,331	
Barges.....	76		76	23,178	
Miscellaneous.....	7		7		
	350		350	3,164	
Unregistered:					
Steamers.....	10		10		
Sailing vessels.....	1	1	2		
Unrigged.....	2		2		
Total.....	3,015	86	3,101	384,729	31,352

¹ Incomplete.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	78,766 short tons.....	78,766	\$387,070.65
Lumber.....	640,000 feet.....	1,000	14,000.00
Brick.....	243,690.....	610	2,500.00
Stone.....	412 short tons.....	412	412.00
Oil.....	114,757 gallons.....	419	4,016.50
Do.....	2,484 short tons.....	2,484	61,525.31
Salt.....	2,500 hogsheads.....	600	5,000.00
Do.....	19,219 short tons.....	19,219	118,129.50
Fish.....	69,055 short tons.....	69,055	2,770,723.62
Wood.....	403 cords.....	1,908	6,467.00
Sand.....	1,074 short tons.....	1,074	500.00
Total.....		175,547	3,340,334.58
Fish.....	80,000 short tons.....	80,000	(¹)
Miscellaneous.....	20,000 short tons.....	20,000	(¹)
Lumber.....	140,000 feet.....	210	(¹)
Total tonnage.....		² 275,757	

¹ Not ascertainable.² Incomplete.

5. BEVERLY HARBOR, MASS.

No work was done. The expenditure of \$2.65 was for engineering expenses.

APPROPRIATIONS.

Previous project, June 13, 1902.....	\$10,000.00
Existing project:	
Mar. 2, 1907.....	\$38,500.00
Mar. 4, 1913 (allotment Jan. 15, 1914).....	250.00
Mar. 4, 1913 (allotment Feb. 3, 1915).....	125.00
	<hr/> 38,875.00
Total of appropriations.....	48,875.00
Damages from surety of failing contractor, existing project.....	122.24
Grand total.....	<hr/> 48,997.24

COMMERCIAL STATISTICS.

ABOVE ESSEX BRIDGE.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	28,581	32,486	24,269	29,229
Lumber.....	6,956	6,021	5,426	5,329
Sand.....		2,100	1,367	
Iron.....	112	1,050		
Tar.....		50		219
Pipe.....				246
Stone.....				208
Total.....	35,649	41,707	31,062	35,231

Vessel classification, 1915.

Classes.	American.	Total net registered tonnage.
Registered:		
Sailing vessels.....	30	8,803
Barges.....	10	6,788
Unregistered sailing vessels.....	2	
Total.....	42	15,591

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	21,328 short tons.....	21,328	\$97,562.40
Lumber.....	3,388,608 feet.....	5,083	75,105.16
Tar.....	44,213 gallons.....	177	1,225.65
Iron.....	213 short tons.....	213	5,020.60
Total.....		26,801	178,913.81

¹ \$500 allotted from appropriation for "Emergencies in river and harbor works," to which appropriation \$250 was restored on Apr. 28, 1914.

² \$150 allotted from appropriation for "Emergencies in river and harbor works," to which appropriation \$25 was restored on Mar. 31, 1915.

Freight traffic—Continued.

BELOW ESSEX BRIDGE.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	128,958	211,939	352,771	288,878
Lumber.....	1,107	193		
Oil.....	77,664	71,131	91,512	96,536
Sand.....	390			
Asphaltum.....	719			
Lime.....	86			
Machinery, etc.....	50			
Pipe.....		90	175	
Rope.....		3		
Leas.....				290
Iron.....				6
Steel.....				1
Cordage.....				2
Miscellaneous.....			1	13
Total.....	¹ 208,974	283,356	424,450	385,726

¹ Incomplete.*Vessel classification, 1915.*

Classes.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers.....	60		60	143,276
Sailing vessels.....	13	3	16	9,797
Barges.....	48		48	29,056
Unregistered				
Sailing vessels.....		1	1	
Unrigged.....	1		1	
Total.....	122	4	126	182,129

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	323,770 short tons.....	323,770	\$1,138,733.80
Lumber.....	300,000 feet.....	450	9,000.00
Paints and oils.....	9 short tons.....	9	195.00
Cordage.....	1 short ton.....	1	53.84
Oil.....	257,914 gallons.....	941	8,061.10
Do.....	844,079 barrels.....	120,498	2,091,009.24
Do.....	985 short tons.....	985	13,707.28
Total.....		446,654	3,260,760.26

CONSOLIDATED.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	157,536	244,425	357,040	318,107
Lumber.....	5,063	6,214	5,426	5,329
Oil.....	77,664	71,131	91,512	96,536
Sand.....	390	2,100	1,367	
Iron.....	112	1,050		6
Asphaltum.....	719			
Lime.....		50		219
Machinery, etc.....	50			
Pipe.....		90	175	246
Rope.....		3		2
Steel.....				205
Leas.....				1
Miscellaneous.....			1	290
Total.....	¹ 244,623	325,063	455,521	420,967

¹ Incomplete.

1882 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Vessel classification, 1915.

Class.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers.....	60	.....	60	143,276
Sailing vessels.....	43	3	46	18,000
Barges.....	58	.....	58	35,834
Unregistered:				
Sailing vessels.....	1	2	3	.....
Unrigged.....	1	.....	1	.....
Total.....	163	5	168	197,700

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	345,098 short tons.....	345,098	\$1,236,296.20
Lumber.....	3,638,008 feet.....	5,533	84,105.16
Paints and oils.....	9 short tons.....	9	195.00
Tar.....	44,218 gallons.....	177	1,225.65
Cordage.....	1 short ton.....	1	53.84
Iron.....	213 short tons.....	213	5,020.60
Oil.....	257,914 gallons.....	941	8,061.10
Do.....	844,079 barrels.....	120,498	2,091,009.24
Do.....	985 short tons.....	985	13,707.28
Total.....		473,455	3,439,674.07

6. SALEM HARBOR, MASS.

No work was done and no expenditures made.

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 547).....	\$53,000.00
Existing project:	
Mar. 3, 1905.....	\$12,000.00
Oct. 2, 1914 (allotment Oct. 7, 1914).....	7,500.00
	19,500.00
Total of appropriations.....	72,500.00
Carried to surplus fund of Treasury:	
In 1899, previous project.....	\$631.34
In 1911, existing project.....	500.00
	1,131.34
Net total.....	71,368.66

COMMERCIAL STATISTICS.

	1911	1912	1913	1914
	Short tons.	Short tons.	Short tons.	Short tons.
Coal.....	132,373	133,135	85,950	52,127
Lumber.....	.....	125	45	56
Wood.....	83	.....	.....	.....
Railroad ties.....	4,891	5,710	342	8,178
Stone.....	1,635	.....	280	1,237
Lime.....	.....	.....	.....	100
Coke.....	.....	.....	.....	1,000
Paving stone.....	.....	.....	.....	999
Sand.....	.....	.....	.....	5,856
Gravel.....	.....	.....	.....	8,123
Miscellaneous.....	.....	.....	2,000	.....
Total.....	138,961	138,970	91,617	77,695

¹ No statistics obtainable from one firm which in 1909 received 38,000 tons.

² Incomplete.

Vessel classification, 1915.

Classes.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers.....	248		248	46,128
Sailing vessels.....	17	1	17	7,094
Barges.....	16		16	3,485
Unregistered:				
Sailing vessels.....	1		1	
Unrigged.....	5		5	
Total.....	287	1	288	56,697

¹ Incomplete.*Freight traffic.*

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	5,940 short tons.....	5,940	\$26,228.81
Lumber.....	488,000 feet.....	782	9,400.00
Brick.....	240,000.....	540	2,000.00
Fire clay.....	9 short tons.....	9	51.76
Fire brick.....	168 short tons.....	168	1,837.71
Railroad ties.....	86,205.....	6,890	53,690.00
Water pipe.....	1,994 short tons.....	1,994	38,444.32
Boilers.....	215 short tons.....	215	20,000.00
Wood.....	419,708 feet.....	690	12,000.00
Cement.....	37,086 barrels.....	7,419	61,250.00
Sand.....	20,014 short tons.....	20,014	17,651.00
Gravel.....	43,327 short tons.....	43,327	36,985.50
Total.....		197,878	281,080.10

¹ Incomplete. No statistics obtainable from one firm which in 1913 received 54,000 tons.

7. LYNN HARBOR, MASS.

No work was done. The expenditure of \$44 was for plotting notes of a survey made in April and May, 1915.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 68d Cong., 3d sess., p. 480).....	\$297,837.00
Existing project:	
June 25, 1910.....	\$60,000.00
July 25, 1912.....	35,000.00
Mar. 4, 1913.....	84,000.00
	<hr/> 179,000.00
Total appropriations.....	476,837.00
Receipts from sales, existing project.....	.39
Grand total.....	<hr/> 476,837.39

COMMERCIAL STATISTICS.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	312,487	352,325	331,560	301,221
Lumber.....	11,640	11,869	10,242	10,280
Sand.....	16,309	20,668	27,170	21,555
Oil.....	6,664	8,631	7,060	5,374
Lime.....	2,168	1,119	2,013	2,073
Cement.....	1,178	684	2,400	600
Gravel.....	200	1,245	675	672
Iron.....	673	1,051	.....	456
Wood.....	433	905	780	776
Brick.....	.....	140	480	.....
Fire clay.....	.....	.....	28	.....
Fire brick.....	.....	.....	123	.....
Tile.....	.....	.....	3	.....
Tar.....	.....	.....	.....	238
Miscellaneous.....	125,037	67,500	48,000	39,000
Total.....	478,574	466,637	430,513	382,203

Vessel classification, 1915.

Class.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers.....	96	.....	96	21,063
Sailing vessels.....	181	10	191	115,420
Barres.....	645	.....	645	284,962
Unregistered:				
Sailing vessels.....	11	1	12	.....
Unrigged.....	7	.....	7	.....
Total.....	940	11	951	373,494

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	274,715 short tons	274,715	\$1,271,916.68
Lumber.....	241 cords	603	1,651.00
Do.....	6,127,921 feet	10,621	119,607.21
Tar.....	334,249 gallons	1,009	11,770.12
Pipe.....	1,378 short tons	1,378	33,123.58
Oil.....	1,469,498 gallons	5,878	51,432.43
Wood.....	18 cords	45	126.00
Lime.....	14,249 barrels	1,435	14,470.15
Do.....	1,500 short tons	1,500	15,000.00
Sand.....	26,808 short tons	26,808	18,219.00
Gravel.....	2,794 short tons	2,794	1,843.34
Miscellaneous.....	58,975 short tons	58,975	(¹)
Total.....		386,761	\$1,630,199.51

¹ The miscellaneous freight was carried by boats under 10 feet draft, doing a general express and package freight business. No accurate statement of value can be given.

² Incomplete.

8. MYSTIC AND MALDEN RIVERS AND MYSTIC RIVER BELOW MOUTH OF ISLAND END RIVER, MA²

(A) MYSTIC RIVER.

No operations were in progress during the fiscal year and no expenditures made.

(B) MALDEN RIVER.

No work was done and no expenditure made, pending fulfillment of the conditions imposed in the acts of Congress adopting the project.

(C) MYSTIC RIVER BELOW THE MOUTH OF ISLAND END RIVER.

Under contract with Eugene Breymann for hire of dredging plant, 24,345 cubic yards of material were dredged from areas aggregating 89,000 square feet, the plant being employed 129 hours and 25 minutes; under lease with him for hire of the same plant, 22,350 cubic yards of material were dredged from areas aggregating 78,000 square feet, the plant being employed 156 hours and 11 minutes.

By these operations (in May, 1916), all shoals in the 30-foot channel were removed, the plant being engaged 285 hours and 36 minutes, at the unit price of \$35 per hour, removing an aggregate of 46,695 cubic yards at a total cost of \$10,313.94.

APPROPRIATIONS.

	Mystic River (upper).	Malden River.	Mystic River below mouth of Island End River.	Total.
Acts of—				
Aug. 2, 1882.....		\$10,000.00		\$10,000.00
July 13, 1892 (allotment Aug. 3, 1892).....	\$5,000.00	\$5,000.00		10,000.00
Aug. 18, 1894 (allotment Aug. 26, 1894).....	\$5,000.00	\$5,000.00		10,000.00
June 3, 1896 (allotment July 11, 1896).....	\$5,000.00	\$5,000.00		10,000.00
Mar. 3, 1899 (allotments July 26, 1899, and Aug. 3, 1900).....	\$2,500.00	\$2,500.00		5,000.00
Mar. 3, 1899.....			\$50,000.00	50,000.00
June 6, 1900 (allotment July 19, 1900).....		\$5,000.00		5,000.00
June 13, 1902 (allotment July 5, 1902).....	\$1,000.00	\$5,000.00	\$19,000.00	25,000.00
Mar. 3, 1905 (allotments Apr. 13, 1905, and Aug. 10, 1905).....	\$10,494.88	\$12,500.00	\$27,005.12	50,000.00
Mar. 2, 1907 (allotments Mar. 30, 1907, Apr. 18, 1908, Aug. 23, 1909, Feb. 27, 1915).....	\$50.00	\$19,950.00	\$40,000.00	60,000.00
June 26, 1910.....			\$72,000.00	72,000.00
Feb. 27, 1911.....	10,000.00		\$10,000.00	10,000.00
July 26, 1912.....		\$80,000.00	\$50,000.00	130,000.00
Mar. 4, 1913.....			\$26,000.00	26,000.00
Total.....	39,044.88	149,950.00	233,005.12	472,000.00
Transferred under authority of act of Mar. 4, 1915.....	10,000.00			10,000.00
Net total.....	29,044.88	149,950.00	233,005.12	462,000.00
Receipts from sales.....			\$2.43	2.43
Grand total.....	29,044.88	149,950.00	233,007.55	462,002.43
Summary:				
Previous projects.....		69,950.00	126,005.12	205,955.12
Present project.....	29,044.88	80,000.00	147,002.43	256,047.31

NOTE.—Appropriations for previous projects are designated by *, and those for existing projects by †.

CONTRACTS IN FORCE.

MYSTIC RIVER BELOW MOUTH OF ISLAND END RIVER.

Hire of dredging plant.

Contractor: Eugene Breymann, Toledo, Ohio.

Character and amount: For hire of dredging plant.

Unit price: \$35 per hour.

Date of contract: December 2, 1914.

Date of approval: December 22, 1914.

Date fixed for commencement: March 15, 1915.

Date fixed for completion: Within not less than six months nor more than one year from date of commencement.

Completed May 14, 1916.

Supplemental contract, with above-named contractor, dated July 15, 1915, approved August 2, 1915, modifying contract of December 2, 1914, to permit dredging in Nixes Mate Channel, Boston Harbor, and in Mystic River. (Completed May 14, 1916.)

Lessor: Eugene Breymann, Toledo, Ohio.

Character and amount: For hire of dredging plant in Boston Harbor, and in channels adjacent or tributary to the harbor.

Unit price: \$35 per hour.

Date of lease: May 8, 1916.

Date fixed for commencement: May 15, 1916.

Date fixed for completion: November 14, 1916.

Completed dredging in Mystic River May 25, 1916.

COMMERCIAL STATISTICS.

MYSTIC RIVER ABOVE WESTERN DIVISION BRIDGE.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	23,800	27,723	21,226	29,127
Stone.....	15,000	13,500		
Lime.....		140		
Lumber.....			3,030	300
Total.....	43,800	41,372	24,226	29,427

Vessel classification, 1915.

Classes.	American.	Foreign.	Total.	Total not registered tonnage.
Registered:				
Sailing vessels.....	27	1	28	15,239
Barges.....	1		1	515
Unregistered:				
Sailing vessels.....		1	1	
Unrigged.....	9		9	
Total.....	37	2	39	15,774

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	27,299 short tons.....	27,299	\$172,465.62
Lumber.....	275,000 feet.....	412	6,000.00
Total.....		27,662	178,465.62

Freight traffic—Continued.

MALDEN RIVER.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	70,804	68,340	75,721	72,880
Sand.....	9,130	12,000	10,955	8,015
Total.....	80,033	80,340	86,676	80,895

Vessel classification, 1915.

Classes.	American.	Total net registered tonnage.
Registered:		
Steamers.....	2	338
Sailing vessels.....	35	16,747
Barges.....	16	7,284
Unregistered:		
Sailing vessels.....	22	.....
Unrigged.....	68	.....
Total.....	138	24,357

Freight traffic.

Articles.	Short tons.	Value.
Coal.....	76,213	\$418,248.50
Sand.....	10,744	18,879.65
Total.....	86,957	437,128.15

MYSTIC RIVER FROM MOUTH OF ISLAND END RIVER TO CHELSEA BRIDGE (NORTH).

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	3,108,102	3,262,830	3,433,313	3,703,287
Lumber.....	26,866	21,240	14,480	68,876
Phosphate rock.....	.....	.....	.....	8,000
Stone.....	120	180	700	180
Salt.....	.....	550	.....	335
Sand.....	800	1,067	878	1,650
Tar.....	4,317	2,800	2,324	3,193
Oil.....	47,490	48,621	40,289	34,788
Coke.....	.....	.....	.....	68
Sugar.....	65,000	58,000	50,000	62,000
Wool.....	3,780	.....	800	2,320
Skus.....	.....	.....	.....	308
Brass meal.....	.....	.....	.....	564
Best pulp.....	.....	.....	.....	882
Iron and steel.....	.....	160	.....	10,500
Railroad ties.....	.....	.....	74,300	9,906
Flour.....	.....	.....	390	.....
Lime.....	90	900	200	.....
Coke.....	6,968	5,424	3,413	.....
Ammonia sulphate.....	800	2,780	820	.....
Cotton.....	1,260	780	780	.....
Fertilizer.....	.....	1,455	.....	.....
Miscellaneous.....	3,110	.....	2,050	1,800
Total.....	3,335,363	3,262,287	3,620,664	3,963,744

Vessel classification, 1915.

Classes.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers.....	123	26	149	410,643
Do.....	129	12	141	(1)
Sailing vessels.....	122		122	137,280
Do.....	59	3	62	(1)
Barges.....	70		70	64,173
Do.....	295		295	(1)
Unregistered, unriggered.....	180		180	
Total.....	978	41	1,019	* 612,094

* Not ascertainable. Largest steamer, Virginian, 5,077 tons net register; largest sailing vessel, Shenandoah, 8,154.

* Incomplete.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	1,481,754 short tons.....	1,481,754	\$4,850,194.50
Coke.....	6,619 short tons.....	6,619	21,867.00
Cotton.....	1,500 bales.....	400	100,000.00
Tar.....	568,882 gallons.....	2,631	18,773.00
Oil.....	10,574,228 gallons.....	38,332	415,000.00
Coal.....		1,529,736	5,405,834.50
Lumber.....		1,925,350	(1)
Stone.....		16,430	(1)
Fertilizer.....		470	(1)
Steel.....		1,755	(1)
Salt.....		100	(1)
Plaster.....		1,700	(1)
Lows.....		1,800	(1)
Sand.....		2,050	(1)
Ice.....		18,900	(1)
Miscellaneous.....		150	(1)
Total.....		320	(1)
Total.....		3,498,761	(1)

* Not ascertainable.

MYSTIC RIVER ABOVE CHELSEA BRIDGE (NORTH), INCLUDING MYSTIC UPPER AND MALDEN RIVERS.

Articles.	1911	1912	1913	1914
	Short tons.	Short tons.	Short tons.	Short tons.
Tar.....		11,661	5,289	8,005
Gravel.....	100	425		951
Railroad ties.....			74,300	9,906
Coal.....	2,341,364	2,303,777	2,588,072	2,803,089
Lumber.....	35,247	43,976	39,425	85,347
Sand.....	9,954	71,123	32,472	47,944
Stone.....	15,120	13,600	850	300
Cotton.....	1,250	770	750	
Iron and steel.....		160		10,500
Oil.....	47,490	43,739	47,813	34,785
Coal tar and products.....	10,874			2,023
Cinder and sulphate soda.....	19,248	19,862	15,451	14,932
Fertilizers.....		1,455		
Lime.....	90	2,040	200	
Salt.....		550		225
Piles.....			390	
Sugar.....	65,000	58,000	50,000	62,069
Coke.....	6,998	5,424	8,413	
Brick.....	100			
Wood.....	3,750		800	2,329
Cresote.....	417			
Nails.....		9		
Sulphate lead.....	100			
Tarred felt.....	46			
Sulphate ammonia.....	600	2,980	1,270	41
Fish.....	365	341		34

Freight traffic—Continued.

MYSTIC RIVER ABOVE CHELSEA BRIDGE (NORTH), ETC.—continued.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Pebbles.....	1,110	1,668		1,354
Grit.....	215			
Roofing paper.....	15			
Building paper.....				197
Beet pulp.....				553
Skins.....				203
Bran meal.....				164
Phosphate rock.....				8,000
Casein.....				65
Miscellaneous.....	4,447		2,736	12,110
Total.....	3,162,570	3,671,242	3,863,879	4,190,646

Vessel classification, 1915.

Classes.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers.....	209	41	250	455,748
Do.....	129	12	141	(1)
Sailing vessels.....	249	1	250	204,699
Do.....	59	3	62	(1)
Barges.....	99		99	84,438
Do.....	295		295	(1)
Miscellaneous.....	1		1	(1)
Unregistered:				
Sailing vessels.....	28	6	34	
Unrigged.....	253		253	
Total.....	1,322	63	1,385	744,845

¹ Not ascertainable. Largest steamer, Virginian, 5,077 tons net register; largest sailing vessel, Shenandoah, 3,154.

² Incomplete.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	1,621,572 short tons	1,621,572	\$5,560,948.72
Coke.....	6,619 short tons	6,619	21,867.00
Lumber.....	12,511,239 feet	18,767	427,939.71
Cotton.....	1,500 bales	400	100,000.00
Sand.....	46,269 short tons	46,269	35,252.20
Crushed stone.....	162 short tons	162	625.35
Gravel.....	526 short tons	525	778.85
Pebbles.....	1,247 short tons	1,247	2,547.25
Oil.....	11,494,762 gallons	42,224	454,132.99
Sugar.....	322,469 bags	46,192	3,237,139.00
Cin. for.....	20,173 short tons	20,173	20,173.00
Roofing paper.....	161 short tons	164	5,621.99
Pitch.....	486 short tons	486	5,676.60
Tar.....	2,404,986 gallons	10,981	85,979.32
Miscellaneous.....	13 short tons	13	1,408.00
Coal.....		1,815,764	9,960,089.79
Lumber.....		1,925,350	(1)
Stone.....		16,430	(1)
Fertilizer.....		470	(1)
Steel.....		1,765	(1)
Salt.....		100	(1)
Plaster.....		1,700	(1)
Logs.....		1,800	(1)
Sand.....		2,050	(1)
Ice.....		16,900	(1)
Miscellaneous.....		150	(1)
Total.....		3,784,789	(1)

¹ Not ascertainable.

9. BOSTON HARBOR, MASS.

THIRTY-FIVE-FOOT CHANNEL.

In payment of liabilities outstanding at the end of the previous year, and for office and engineering expenses, \$13,050.38 were expended. The removal of shoals in the channel was continued with the dredging plant hired from Eugene Breymann under contract dated December 2, 1914, and under lease dated May 8, 1916. The plant consisted of the dredge *Eugene*, four scows of a total capacity of about 3,700 cubic yards, and necessary towboats. Under the contract the dredge was employed for a total of 3,576 hours and 10 minutes, working over an area of about 2,889,100 square feet in the upper harbor, removing 409,539 cubic yards; and over an area of about 592,750 square feet in Broad Sound, removing 97,515 cubic yards. Under the lease the dredge was employed for a total of 244 hours and 16 minutes, working over an area of about 253,000 square feet in the upper harbor, and removing 28,992 cubic yards. Unit price under contract and lease—\$35 per hour; expenditure, \$182,181.37. The total expenditures were \$195,231.75.

GENERAL IMPROVEMENT.

By day labor, repair of the sea walls was completed at Deer Island, where 948 dowel holes were drilled, 1,034 dowels set, and 1,500 feet of wall pointed; at Long Island, where 681 dowel holes were drilled, 681 dowels set, and 700 feet of wall pointed; and at Rainsford and Georges Islands, where sections of the walls were rebuilt. At the close of the year work was in progress at Gallups Island, where about 760 feet of wall had been pointed. Expenditure, \$9,630.90.

Under lease with Eugene Breymann, dated May 8, 1916, for hire of dredging plant, the plant was employed in Nixes Mate Channel for 204 hours and 18 minutes, 19,494 cubic yards of material being removed, completing the restoration of the channel on June 18, 1916. Unit price, \$35 per hour; expenditure, \$2,057.29.

Under contract with Coastwise Dredging Co., dated July 14, 1915, work was commenced in Chelsea Creek (upper) on August 9, 1915, 95,021 cubic yards of material being removed, completing the restoration of the channel except at the extreme upper end where it is not now navigated, on October 22, 1915. Unit price, 15.49 cents per cubic yard; expenditure, \$17,064.12.

The directors of the port of Boston having requested a modification of the harbor lines to better provide for the future development of the harbor, a survey was made and a new harbor line established at East Boston, commencing on the property of the Boston & Albany Railroad known as Leyland Pier, extending thence to and around Governors Island, and thence to Orient Heights; and at South Boston, commencing at Pier No. 2 of the New York, New Haven & Hartford Railroad, thence along the southerly side of the main ship channel to the entrance to the reserved channel, thence following the lines of the reserved channel to E Street, and thence to and around Castle Island to P Street. A plan of the new harbor line as approved by the Sec-

retary of War June 30, 1916, is published herewith. Expenditure, \$2,000.

The total expenditures were \$30,752.31.

CHELSEA CREEK (LOWER).

Under contract with Morris & Cummings Dredging Co., dated February 26, 1915, work was commenced on July 14, 1915, 227,840 cubic yards of material being removed, completing the project on April 12, 1916. Unit price, 12.6 cents per cubic yard; expenditure, \$33,810.89.

APPROPRIATIONS.

	Previous projects.	Existing project.	Total.
Act of—			
1825-1831 (see H. Doc. No. 1491, 63d Cong., 2d sess., pp. 411-412).....	\$2,016,446.10		\$2,016,446.10
Aug. 2, 1892.....	86,948.24	\$9,551.76 (1)	96,500.00
July 5, 1894.....	5,000.00		5,000.00
Aug. 5, 1896.....	37,723.00	18,527.00 (6)	56,250.00
Aug. 11, 1888.....	125,000.00		125,000.00
Sept. 19, 1890.....	112,519.44	15,431.21 (1) 16,049.25 (2)	145,000.00
July 13, 1892.....	35,000.00	265,000.00 (2)	300,000.00
Aug. 18, 1894.....	10,000.00	190,000.00 (2)	200,000.00
June 3, 1896.....	17,204.06	45,798.91 (2) 7,000.00 (5)	70,000.00
June 4, 1897.....		400,000.00 (2)	400,000.00
July 1, 1898.....		250,000.00 (2)	250,000.00
Mar. 3, 1899 (sundry civil act).....		163,751.00 (2)	163,751.00
Mar. 3, 1899 (river and harbor act).....	65,000.00	5,000.00 (3) 5,000.00 (5)	75,000.00
June 6, 1900.....		317,000.00 (3)	317,000.00
Mar. 3, 1901.....		133,000.00 (3)	133,000.00
June 12, 1902.....	60,667.32	600,000.00 (4) 39,332.68 (5)	700,000.00
June 26, 1902.....		143,731.00 (2)	175,000.00
Mar. 3, 1903.....		81,269.00 (4)	150,000.00
Apr. 28, 1904.....		150,000.00 (4)	150,000.00
Mar. 3, 1906 (sundry civil act).....		350,000.00 (4)	350,000.00
Mar. 3, 1906 (river and harbor act).....		970,000.00 (4)	970,000.00
Mar. 3, 1906 (river and harbor act).....	21,191.96	21,728.81 (5) 67,079.23 (6)	100,000.00
June 20, 1906.....		600,000.00 (4)	600,000.00
Mar. 2, 1907.....	44,225.79	5,479.26 (5) 224.95 (6)	550,000.00
Mar. 4, 1907.....		500,000.00 (4)	980,000.00
Mar. 4, 1908.....		830,000.00 (4)	1,200,000.00
June 25, 1910 (sundry civil act).....		1,200,000.00 (4)	900,000.00
June 25, 1910 (river and harbor act).....	25,000.00	900,000.00 (4)	25,000.00
Mar. 4, 1911.....		900,000.00 (4)	900,000.00
July 26, 1912.....		85,000.00 (7)	85,000.00
Aug. 24, 1912.....		25,000.00 (4)	25,000.00
Mar. 4, 1913.....	10,112.22	2,487.78 (1) 12,400.00 (5)	25,000.00
June 23, 1913.....		150,000.00 (4)	150,000.00
Oct. 2, 1914 (allotment Oct. 7, 1914).....	12,500.00	* 127,500.00 (4)	200,000.00
Mar. 4, 1915 (allotment Apr. 1, 1915).....	10,000.00	* 94,500.00 (4)	104,500.00
July 27, 1916.....		* 100,000.00 (4)	100,000.00
Carried to surplus fund of Treasury, 1832-1873 and 1909.....	2,695,528.12 21,619.52	9,806,918.97	12,592,447.10 21,619.52
Receipts from sales.....	2,673,908.61 206.72	10.00 (2) 469.62 (4) 1.75 (5)	12,570,827.68 748.09
Total.....	2,674,175.33	9,807,400.34	12,571,875.67

* Includes appropriations for sea walls, begun under act of Mar. 2, 1825, and part of the existing project; but the earlier appropriations are not separable from funds pertaining to previous projects.

* \$31,200 of appropriation of \$175,000 for 27-foot channel transferred Apr. 1, 1915, to 35-foot channel under authority of river and harbor act approved Mar. 4, 1915.

* Maintenance.

Summary.

Previous projects.....	\$2, 674, 175. 88
Existing project:	
(1) Nixes Mate Channel.....	\$27, 470. 75
(2) 27-foot channel.....	1, 474, 387. 29
(3) 80-foot channel.....	455, 000. 00
(4) 85-foot channel.....	7, 688, 738. 62
(5) Chelsea Creek (upper).....	90, 952. 60
(6) Fort Point Channel.....	75, 901. 18
(7) Chelsea Creek (lower).....	85, 000. 00
	<hr/>
	9, 897, 400. 34
	<hr/>
	12, 571, 575. 67

NOTE.—The dates of allotments are given if known.

CONTRACTS IN FORCE.**BOSTON HARBOR, MASS.***Hire of dredging plant.*

Contractor: Eugene Breymann, Toledo, Ohio.

Character and amount: For hire of dredging plant in Boston Harbor, Mass.

Unit price: \$35 per hour.

Date of contract: December 2, 1914.

Date of approval: December 22, 1914.

Date fixed for commencement: March 15, 1915.

Date fixed for completion: Within not less than six months nor more than one year from date of commencement.

Completed May 14, 1916.

Supplemental contract with above-named contractor, dated July 15, 1915, approved August 2, 1915, modifying contract of December 2, 1914, to permit dredging in Nixes Mate Channel, Boston Harbor, and in Mystic River. (Completed May 14, 1916.)

Lessor: Eugene Breymann, Toledo, Ohio.

Character and amount: For hire of dredging plant in Boston Harbor and in channels adjacent or tributary to the harbor.

Unit price: \$35 per hour.

Date of lease: May 8, 1916.

Date fixed for commencement: May 15, 1916.

Date fixed for completion: November 14, 1916.

Percentage of completion at end of fiscal year: 25.

Chelsea Creek, Mass.

Contractor: Morris & Cumings Dredging Co., New York, N. Y.

Character and amount: For dredging about 325,000 cubic yards in Chelsea Creek (lower), Boston Harbor, Mass.

Unit price: 12.6 cents per cubic yard.

Date of contract: February 26, 1915.

Date of approval: March 10, 1915.

Date fixed for commencement: April 14, 1915; extended to July 14, 1915.

Date fixed for completion: No definite date fixed; minimum rate 35,000 cubic yards per month.

Completed April 12, 1916.

Contractor: Coastwise Dredging Co., Norfolk, Va.

Character and amount: For dredging about 100,000 cubic yards in Chelsea Creek (upper), Boston Harbor, Mass.

Unit price: 15.49 cents per cubic yard.

Date of contract: July 14, 1915.

Date of approval: August 6, 1915.

Date fixed for commencement: September 11, 1915.

Date fixed for completion: No definite date fixed; minimum rate 20,000 cubic yards per month.

Completed October 22, 1915.

¹ Includes appropriations for sea walls, begun under act of Mar. 2, 1825, and part of the existing project, but the earlier appropriations are not separable from funds pertaining to previous projects.

Miscellaneous.

Contract dated September 11, 1913: Trustees of Barristers Hall, Boston, Mass., contractors, for rent of office rooms at Boston, Mass., at the rate of \$300 per month; to be commenced October 1, 1913, and to expire by limitation September 30, 1916.

Contract dated January 19, 1915: National Dock & Storage Warehouse Co., Boston, Mass., contractor, for rent of wharf, shed, and office in East Boston, Mass., at the rate of \$250 per month; to be commenced February 13, 1915, and to expire by limitation June 30, 1916, but may be terminated by either party upon 90 days' notice in writing. (Expired June 30, 1916.)

Contract dated June 13, 1916: National Dock & Storage Warehouse Co., Boston, Mass., contractor, for rent of wharf, shed, and office at East Boston, Mass., at the rate of \$250 per month; to be commenced July 1, 1916, and to expire by limitation June 30, 1917, but may be terminated by either party upon 90 days' notice in writing.

COMMERCIAL STATISTICS.

The following statement concerning the foreign trade at the port of Boston is compiled from statistics and records of the Boston Chamber of Commerce and of the collector of the port. It comprises only imports and exports and does not include domestic, coastwise, and local traffic. Vessels engaged in the coastwise trade, unless they have in their cargoes bonded merchandise to the value of \$350 or more, are not required by law to take out clearance papers, and no statistics of their carrying trade are accessible. In all the following tables, except receipts of coal, the figures previous to 1914 show statistics for Boston Harbor only; beginning with 1914 they include Boston and its subports of Salem, New Bedford, Fall River, Plymouth, Gloucester, Vineyard Haven, Barnstable, and Provincetown, all of which are now included in the collection district of Massachusetts. The value of domestic and foreign exports for the subports of Boston for 1915 was \$129,108; and of imports \$6,680,846.

FOREIGN TRADE.

Comparative statement of quantity and value of exports and imports and of customs collected.

Years.	Exports.		Imports.		Total.		Customs collected.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
	<i>Short tons.</i>		<i>Short tons.</i>		<i>Short tons.</i>		
1887.....		\$19,317,841		\$47,288,747		\$66,606,588	\$16,207,198.54
1903.....		86,429,968		82,762,828		169,192,816	22,360,096.75
1904.....		87,866,428		86,269,648		174,135,076	23,102,087.97
1905.....	1,294,815	93,797,867	974,712	106,065,998	2,269,527	199,863,865	26,208,144.20
1906.....	1,366,786	99,370,016	1,229,623	110,353,970	2,596,409	209,723,986	27,459,534.50
1907.....	1,537,019	104,610,908	1,107,764	123,414,168	2,644,783	228,025,076	26,238,897.33
1908.....	1,064,445	84,353,586	979,976	89,121,861	2,044,421	173,475,617	22,562,253.32
1909.....	828,519	72,966,869	1,165,349	127,031,679	1,993,868	199,998,548	30,964,305.85
1910.....	765,500	69,482,859	1,256,892	127,448,079	2,022,392	196,930,966	27,114,516.11
1911.....	774,068	73,912,325	1,316,136	115,662,063	1,590,274	189,575,378	22,534,863.31
1912.....	659,117	65,622,646	1,330,871	150,618,243	1,990,988	216,240,889	27,282,966.08
1913.....	1,100,360	70,854,661	1,264,642	131,546,592	2,365,002	202,401,253	19,222,925.31
1914.....	726,967	71,963,879	1,352,542	163,012,089	2,079,499	234,976,978	10,158,818.47
1915.....	(¹)	119,496,294	(¹)	170,431,142	(¹)	289,927,436	9,587,746.00

¹ Not ascertainable.

The leading articles of export and import at the port of Boston for the calendar year 1915, with the quantity and value of each, were as follows:

	Short tons.	Value.
IMPORTS.		
Chemicals, drugs, and dyes.....	(¹)	\$3,214,689
Cotton, raw.....	69,722	19,302,107
Cotton waste (free).....	4,908	417,370
Cotton manufactures.....	(¹)	776,503
Earthenware and china ware.....	(¹)	397,100
Fibers and vegetable grasses.....	81,953	9,554,112
Fish.....	(¹)	2,859,887
Fruit and nuts.....	(¹)	2,730,516
Hides and skins.....	(¹)	23,980,036
India rubber and manufactures.....	(¹)	291,340
Iron, steel, and manufactures.....	(¹)	2,037,120
Leather and manufactures.....	(¹)	2,759,861
Sugar.....	219,644	14,906,954
Wood and manufactures.....	(¹)	3,287,649
Wool.....	110,973	54,977,786
Miscellaneous.....	(¹)	28,958,112
Total.....	(¹)	170,431,162
EXPORTS.		
Live animals.....	(¹)	1,120,510
Agricultural implements.....	(¹)	266,672
Breadstuffs.....	(¹)	10,979,377
Cotton manufactures.....	(¹)	5,266,844
Cotton waste.....	6,427	1,071,470
Cotton, raw.....	26,640	4,974,333
Apples, dried.....	26	3,709
Apples, green.....	38,740	1,735,448
India rubber manufactures.....	(¹)	2,229,434
Steel billets, rails, other manufactures.....	(¹)	10,620,774
Leather and manufactures.....	(¹)	31,466,445
Meat and dairy products.....	(¹)	26,911,423
Paper and manufactures.....	(¹)	1,313,340
Rum.....	5,260	1,896,393
Tobacco and manufactures.....	2,001	533,410
Wood and manufactures.....	(¹)	2,254,566
Wool and manufactures.....	(¹)	1,205,991
Miscellaneous.....	(¹)	16,597,305
Total.....	(¹)	119,496,294

¹ Not ascertainable.

Passengers arriving from and departing for foreign countries by trans-Atlantic lines.

Years.	Cabin passengers.			Steerage passengers.			Total.
	Inward.	Outward.	Total.	Inward.	Outward.	Total.	
1902.....	12,298	8,584	20,887	52,167	13,815	65,982	86,849
1903.....	15,511	10,544	26,055	60,143	15,547	75,690	101,745
1904.....	13,604	10,995	24,599	63,551	13,604	77,155	101,754
1905.....	15,092	10,758	25,850	57,184	18,672	75,856	101,706
1906.....	18,862	14,686	33,538	68,014	22,407	90,421	123,959
1907.....	19,479	12,639	32,118	71,313	27,163	98,476	131,024
1908.....	16,296	9,946	26,242	31,654	31,851	63,505	89,747
1909.....	17,102	9,252	26,354	47,198	17,369	64,567	90,921
1910.....	20,414	10,849	31,263	54,676	17,042	71,718	102,981
1911.....	22,148	10,430	32,578	38,962	24,397	63,349	95,927
1912.....	22,965	12,722	35,677	47,299	21,943	69,211	104,888
1913.....	29,012	15,167	44,180	69,496	24,332	93,828	138,008
1914.....	21,114	22,336	43,450	28,925	27,648	56,573	100,023
1915.....	3,060	817	3,867	8,621	7,468	16,089	19,956

The steamer *Oretio*, of 13,518 gross tons and draft of 32 feet 10½ inches, of the White Star Line; the steamer *Ceresia*, of 19,687 tons and draft of 33 feet 3½ inches, of the Cunard Line; and the steamer *Amerika*, of 22,622 tons and

draft of 33 feet 6 inches, of the Hamburg-American Line, are the largest of the transatlantic liners usually sailing from this port. The Hamburg-American Line vessels are not running at present on account of the war.

Foreign entrances and clearances, 1915.

Classes.	Entered from foreign ports.		Cleared for foreign ports.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
American steam vessels.....	194	288,277	166	240,328	360	528,605
American sailing vessels.....	146	38,601	114	28,228	260	66,829
Foreign steam vessels.....	843	1,911,192	567	1,219,650	1,410	3,130,842
Foreign sailing vessels.....	252	31,480	245	28,984	497	60,414
Total.....	1,435	2,269,550	1,092	1,517,140	2,527	3,786,690

Domestic and coastwise arrivals and departures.

Classes.	Arrivals.		Departures. ¹		Total.	
	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.
Steamers.....	3,540	8,207,646	3,540	8,207,646	7,080	16,415,292
Sailing vessels.....	771	357,050	771	357,050	1,542	714,100
Tugs.....	2,343	735,367	2,343	735,367	4,686	1,470,734
Barges.....	3,961	3,585,446	3,961	3,585,446	7,922	7,170,892
Total.....	10,615	12,885,509	10,615	12,885,509	21,230	25,771,018

¹ Approximate.

Receipts of coal.

[Long tons.]

Years.	By sea.			Total by rail	Total by all routes.
	Anthracite.	Bituminous.	Total.		
1894.....	1,061,785	2,948,288	4,010,073	158,509	5,068,652
1895.....	1,041,478	3,365,657	5,307,135	77,024	5,384,159
1896.....	1,630,674	3,430,665	5,061,339	116,266	5,177,605
1897.....	2,016,262	3,741,709	5,757,971	126,968	5,884,939
1898.....	1,733,112	3,611,271	5,344,383	106,666	5,451,049
1899.....	1,668,126	3,621,720	5,289,846	140,121	5,429,967
1900.....	1,760,883	3,250,815	5,011,698	218,324	5,230,022
1901.....	1,881,767	4,365,606	6,247,373	170,658	6,418,031
1902.....	1,654,156	4,784,646	6,438,802	239,215	6,678,017
1903.....	1,676,311	5,214,346	6,890,657	225,336	7,116,993
1904.....	1,719,099	5,125,426	6,844,524	244,866	7,089,390
1905.....	1,609,980	5,050,551	6,660,531	271,827	6,932,358

1896 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

SUMMARY.

Vessel movement.

Years.	Foreign trade.		Domestic trade.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
1902.....	3,345	4,698,216	17,032	14,583,862	20,377	19,282,078
1903.....	2,973	5,119,468	18,032	16,839,578	21,005	21,959,046
1904.....	2,688	4,800,888	17,598	16,820,728	20,286	21,621,596
1905.....	2,904	4,980,410	18,132	17,874,916	21,036	22,855,326
1906.....	2,966	5,395,119	17,286	18,549,230	20,252	23,944,349
1907.....	2,808	5,148,434	19,232	20,522,948	22,040	25,671,382
1908.....	2,479	4,815,031	18,230	21,087,052	20,709	25,902,983
1909.....	2,551	4,545,773	19,362	24,478,668	21,913	29,024,441
1910.....	2,505	4,659,751	19,062	23,806,748	22,487	28,466,499
1911.....	2,488	4,799,575	20,480	23,811,774	22,968	28,611,349
1912.....	2,566	4,929,780	19,574	24,516,060	22,540	29,445,840
1913.....	2,529	5,277,485	21,146	24,749,328	23,675	30,026,813
1914.....	2,887	5,027,785	19,578	24,467,134	22,765	29,494,899
1915.....	2,527	3,786,690	21,230	25,771,018	23,757	29,557,708

CHELSEA CREEK (UPPER 1 MILE OF RIVER).

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	12,578	12,894	10,475	10,678
Sand.....	1,200	1,150	1,376	1,488
Lumber.....			750	150
Stone.....			1,000	20
Piles.....			760	500
Iron.....				10
Total.....	13,778	14,053	14,351	12,846

Vessel classification, 1915.

Classes.	American.	Total net registered tonnage.
Registered:		
Balling vessels.....	1	733
Barges.....	5	2,429
Unregistered unrigged.....	12	.....
Total.....	18	3,161

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	13,728 short tons.....	13,738	\$80,841.50
Lumber.....	230,000 feet.....	460	8,077.00
Iron.....	50 short tons.....	60	3,000.00
Total.....		14,248	71,891.50

Freight traffic—Continued.

CHELSEA CREEK BETWEEN MERIDIAN STREET BRIDGE AND CHELSEA STREET BRIDGE.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	32,195	33,659	34,596	73,291
Oil.....	281,085	314,081	197,967	231,445
Lumber.....	4,212	5,553	1,971	2,425
Stone.....	100	500	100	1,500
Iron.....	50	100	100	100
Chalk.....	9,329	11,469	13,078	8,944
Cement.....	20	20	20	60
Sand and gravel.....	4,248	4,324	4,430	3,142
Brick.....	2,500	867	500	.....
Pipe.....	596	581	361	1,111
Piles.....	250	2,500	250	.....
Edgestones.....	75	.....	.....	.....
Tar.....	7,255	6,013	9,009	10,475
Machinery and equipment.....	.....	545	.....	100
Wood.....	.....	250	250	750
Steel.....	.....	50	.....	100
Iron oxide.....	.....	.....	50	.....
Fire brick, etc.....	.....	.....	.....	200
Miscellaneous.....	200	40	500	440
Total.....	342,703	330,752	322,972	334,063

Vessel classification, 1915.

Classes.	American.	Total net registered tonnage.
Registered:		
Steamers.....	9	4,442
Sailing vessels.....	52	40,079
Barges.....	283	17,051
Miscellaneous.....	5	200
Unregistered:		
Sailing vessels.....	4	.....
Unrigged.....	92	.....
Total.....	445	61,772

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	76,484 short tons.....	76,484	\$330,170.11
Lumber.....	2,009,192 feet.....	3,014	41,465.58
Stone.....	900 short tons.....	900	1,500.00
Tar.....	2,822,000 gallons.....	14,110	85,710.09
Crude chalk.....	12,282 short tons.....	12,282	61,410.00
Iron.....	100 short tons.....	100	5,000.00
Oil.....	10 barrels.....	2	100.00
Do.....	262,223 short tons.....	262,223	5,648,111.35
Piles.....	10,000 linear feet.....	49	2,500.00
Cement.....	400 barrels.....	80	700.00
Sand.....	1,074 short tons.....	1,074	2,620.00
Gravel.....	1,074 short tons.....	1,074	1,174.04
Pipe.....	342 short tons.....	342	6,288.12
Total.....	.....	371,784	6,195,749.18

Freight traffic—Continued.

CHELSEA CREEK CONSOLIDATED.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	44,778	46,553	104,571	83,909
Oil.....	261,008	314,081	197,987	261,445
Lumber.....	4,212	5,553	2,721	2,575
Stone.....	100	500	1,100	1,520
Iron.....	50	100	100	110
Chalk.....	9,329	11,469	13,078	8,944
Cement.....		20	20	60
Sand and gravel.....	5,448	5,683	5,806	4,630
Brick.....	2,500	267	500	
Pipe.....	596	581	261	1,111
Piles.....	250	2,500	1,000	500
Edgestone.....	75			
Tar.....	7,255	6,012	9,009	10,475
Machinery and equipment.....		545		100
Wood.....		250	250	750
Steel.....		50		100
Iron oxide.....			50	
Fire brick, etc.....				200
Miscellaneous.....	200	40	500	440
Total.....	356,481	304,805	337,323	346,929

Vessel classification, 1915.

Class es.	American.	Total net registered tonnage.
Registered:		
Steamers.....	9	4,442
Sailing vessels.....	53	40,811
Barges.....	268	19,490
Miscellaneous.....	5	200
Unregistered:		
Sailing vessels.....	4	
Unrigged.....	104	
Total.....	463	64,933

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	90,222 short tons.	90,222	\$400,011.61
Lumber.....	2,230,192 feet.	3,474	49,515.56
Stone.....	900 short tons.	900	1,800.00
Tar.....	2,822,000 gallons.	14,110	85,710.00
Crude chalk.....	12,263 short tons.	12,263	61,410.00
Iron.....	150 short tons.	150	8,000.00
Oil.....	10 barrels.	2	100.00
Do.....	262,228 short tons.	262,228	5,648,111.85
Piles.....	10,000 linear feet.	49	2,500.00
Cement.....	400 barrels.	30	700.00
Sand.....	1,074 short tons.	1,074	2,620.00
Gravel.....	1,074 short tons.	1,074	1,174.04
Pipe.....	342 short tons.	342	6,288.12
Total.....		336,963	6,397,640.08

Vessel classification, 1915—Continued.

PORT POINT CHANNEL.

Articles.	1911	1912	1913	1914
Coal.....	<i>Short tons.</i> 1,082,625	<i>Short tons.</i> 723,363	<i>Short tons.</i> 693,792	<i>Short tons.</i> 694,364
Lumber.....	64,711	77,407	71,405	23,886
Brick.....	7,069	12,534	12,854	17,638
Stone.....	4,780	4,111	12,303	8,541
Sugar.....	164,000	171,033	191,266	157,712
Plaster boards.....		468	210	190
Steel.....	300		350	
Molasses.....	6,000	17,180	8,000	12,912
Iron.....	6,103	5,364	15,804	7,221
Oil.....	200	440	210	366
Salt.....	300	250	420	
Wood.....	6,766	4,757	235	3,706
Lime.....	5,348	12,325	11,062	7,312
Cement.....	1,000	820	8,272	5,903
Sand.....	11,283	19,699	30,225	26,219
Gravel.....	6,267	6,726	4,863	5,357
Plaster.....	7,491	12,084	1,672	2,694
Grindstones.....	1,404			1,246
Raw clay.....	65			
Curb and flagstone.....	950	3,614		
Edgestone.....	4,327			
Fire brick.....				121
Fire clay.....			12	25
Barrels.....	300	166		900
Paving block.....	795	2,441		
Laths.....	1,096	2,550	2,579	1,331
Pipe.....	1,156	425	1,493	1,117
Paper.....		18,000	12,000	11,010
Shingles.....		24	55	62
Coke breeze.....		3,110	2,937	2,391
Logs.....		1,518	1,000	1,200
Strapping.....				17
Pebbles.....				875
Bed.....				5
Lobsters.....				3
Pine cones.....			11	
Measure salt.....			3,880	
Miscellaneous.....	147,285		1,200	
Total.....	1,507,621	1,101,374	1,091,211	1,281,674

¹ Incomplete.

Vessel classification, 1915.

Classes.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers.....	294	50	344	180,445
Do.....	45		45	
Sailing vessels.....	520	27	547	345,493
Do.....	26		26	
Barges.....	98		98	43,946
Do.....	3		3	
Miscellaneous.....	1		1	395
Unregistered:				
Steamers.....	22		22	
Sailing vessels.....	41	2	43	
Unrigged.....	159		159	
Total.....	1,219	79	1,298	1,570,279

¹ Incomplete.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	918,011 short tons.....	918,011	\$4,133,214.13
Lumber.....	12,458,717 feet.....	18,893	320,476.80
Do.....	9,620,789 square feet.....	14,431	211,657.00
Do.....	308 short tons.....	308	4,730.00
Brick.....	4,118,400.....	8,781	36,456.79
Do.....	64 short tons.....	64	555.00
Stone.....	1,438 short tons.....	1,438	9,903.00
Sugar.....	182,024 short tons.....	182,024	14,145,500.00
Grindstones.....	900 short tons.....	900	18,000.00
Coke breeze.....	742 short tons.....	742	1,523.85
Pipe.....	1,016 short tons.....	1,016	20,320.00
Laths.....	5,775,000.....	1,744	22,272.40
Do.....	500 short tons.....	500	3,000.00
Molasses.....	3,369 barrels and 1,946,119 gallons.....	11,080	201,456.00
Pickets.....	2,160.....	2	52.50
Plaster boards.....	16,000.....	120	1,600.00
Salt.....	374 short tons.....	374	5,285.00
Edge and corner stone.....	77,635 feet; 362 pieces.....	6,551	48,244.10
Wood.....	1,108 cords.....	2,770	6,250.00
Plaster.....	12,730 barrels.....	1,886	23,381.00
Do.....	11,680 bags.....	584	6,864.00
Lime.....	50,310 barrels.....	5,444	47,764.70
Do.....	801 short tons.....	801	7,711.00
Cement.....	110,480 bags.....	5,524	20,362.00
Do.....	8,000 barrels.....	1,500	12,000.00
Sand.....	120,518 short tons.....	120,518	88,766.00
Iron.....	4,706 short tons.....	4,706	98,218.56
Gravel.....	23,129 short tons.....	23,129	26,072.68
Clay.....	20 short tons.....	20	140.00
Logs.....	900 short tons.....	900	11,000.00
Miscellaneous.....	500 short tons.....	500	20,000.00
Fertilizer.....	10,826 short tons.....	1,345,261 10,826	19,574,769.51 (^c)
Total.....		1,356,087	(^c)

1 Not ascertainable.

10. DORCHESTER BAY AND NEPONSET RIVER, MASS.

No operations were in progress and no expenditures made.

APPROPRIATIONS.

Present project, Mar. 2, 1907.....	\$125,233
Transferred under authority of river and harbor act approved Mar. 4, 1915.....	30,000
Net total.....	95,233

COMMERCIAL STATISTICS.

ABOVE NEPONSET HIGHWAY BRIDGE.

[Commonwealth of Massachusetts improvement.]

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	56,996	52,894	60,608	88,682
Wood.....	275	543	288	.....
Total.....	56,270	53,437	60,896	88,682

Vessel classification, 1915.

Classes.	American.	Total net registered tonnage.
Registered sailing vessels.....	61	39,426
Unregistered:		
Sailing vessels.....	2	
Unrigged.....	4	
Total.....	67	39,426

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	70,652 short tons.....	70,652	\$326,102.44
Wood.....	115 cords.....	238	686.25
Total.....		70,940	326,788.69

BELOW NEPONSET HIGHWAY BRIDGE.

(United States improvement.)

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	128,445	101,226	126,514	123,697
Lumber.....	20,855	28,306	21,244	19,335
Oil.....				103
Brick.....	4,405	7,185	2,905	2,735
Lime.....	3,160	1,888	2,467	2,725
Sand.....	1,884	2,027	1,639	1,151
Tar, oxide, etc.....		300	800	915
Coke.....			3,607	
Pipe.....	638	532	590	775
Clay.....	541			
Leads.....	1,325		1,233	668
Shingles.....	516		136	226
Wood blocks.....		1,294		
Salt.....			42,150	
Ammoniacal liquor.....			628	1,285
Miscellaneous.....	38,000			
Total.....	199,769	¹ 142,740	202,913	163,566

¹ Incomplete; figures not ascertainable from one firm who in 1910 received 38,000 tons of coal.*Vessel classification, 1915.*

Classes.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Sailing vessels.....	146	5	151	60,343
Barges.....	10		10	4,106
Unregistered:				
Sailing vessels.....	8	10	18	
Unrigged.....	2		2	
Total.....	166	15	181	¹ 64,451

¹ Incomplete.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	86,556 short tons.....	86,556	\$428,724.33
Lumber.....	12,587,828 feet.....	16,413	293,307.86
Laths.....	1,655,300.....	567	6,340.60
Shingles.....	488,250.....	122	2,013.33
Sand.....	2,118 short tons.....	2,118	2,118.00
Lime.....	26,824 barrels.....	2,682	26,575.50
Pipe.....	1,089 short tons.....	1,089	21,780.00
Brick.....	381,700.....	763	3,157.90
Total.....		¹ 110,310	¹ 788,028.01

¹ Incomplete.

CONSOLIDATED.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal.....	184,440	154,120	186,122	222,379
Lumber.....	20,855	28,306	21,244	19,335
Oil.....				103
Brick.....	4,406	7,166	2,905	2,786
Lime.....	3,160	1,888	2,467	2,725
Sand.....	1,884	2,027	1,639	1,151
Tar, oxide, etc.		300	800	915
Coke.....			3,607	
Pipe.....	638	532	590	775
Clay.....	541			
Laths.....	1,325		1,233	668
Shingles.....	516		136	226
Wood.....	275	543	288	
Wood blocks.....		1,294		
Salt.....			42,150	
Ammoniacal liquor.....			628	1,235
Miscellaneous.....	38,000			
Total.....	256,089	¹ 196,177	263,809	252,247

¹ Incomplete; figures not ascertainable from one firm who in 1910 received 38,000 tons of coal.

Vessel classification, 1915.

Classes.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Sailing vessels.....	207	5	212	99,798
Barges.....	10		10	4,108
Unregistered:				
Sailing vessels.....	10	10	20	
Unrigged.....	6		6	
Total.....	233	15	248	¹ 103,876

¹ Incomplete.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	157,208 short tons.....	157,208	\$754,837.26
Lumber.....	12,587,828 feet.....	16,413	293,307.86
Brick.....	381,700.....	763	3,157.90
Shingles.....	488,250.....	122	2,013.33
Pipe.....	1,089 short tons.....	1,089	21,780.00
Laths.....	1,655,300.....	567	6,340.60
Wood.....	115 cords.....	288	686.25
Lime.....	26,824 barrels.....	2,682	26,575.50
Sand.....	2,118 short tons.....	2,118	2,118.00
Total.....		¹ 181,250	¹ 1,109,816.70

¹ Incomplete.

11. WEYMOUTH RIVER, MASS.

(A) WEYMOUTH FORE RIVER.

By hired dredging plant, two shoals immediately below the Weymouth Fore River Bridge at Quincy Point (one in each draw passage of the bridge) were removed during the month of August, 1915, to the depth of 18 feet at mean low water, at an expenditure of \$336.77. Rate, \$150 per day of eight hours.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 576) ..	\$255,250
Existing project, July 27, 1915	200,000
Total of appropriations	455,250
Transferred under authority of river and harbor act of Mar. 4, 1915 ..	64,500
Net total	390,750

COMMERCIAL STATISTICS.

[Including Town River.]

	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Coal	145,162	148,896	151,895	146,126
Lumber	11,400	12,082	12,721	6,606
Brick	245	451	242	.....
Sand and gravel	786	520	705	1,984
Ties	3,194	2,620	2,920	582
Stone	9,620	3,500	4,960	16,000
Steel and iron	40	.....	.....	850
Boilers .....	.....	500	750	300
Laths	528	484	532	.....
Shingles	673	368	.....	.....
Manufactured articles	1,712	.....	.....	.....
Turbines .....	.....	350	.....	.....
Coke .....	.....	.....	.....	1,560
Granite .....	.....	.....	.....	100
Oil .....	.....	.....	.....	658
Lime .....	.....	.....	.....	217
Flax .....	.....	.....	.....	243
Miscellaneous	25	500	335	200
Total	173,445	170,266	176,051	176,585

Vessel classification, 1915.

Classes.	American	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers	257	1	258	23,516
Sailing vessels	104	5	109	53,441
Barges and lighters	69	.....	69	42,401
Naval vessels	30	23	63	63,100
Miscellaneous	13	.....	13	2,200
Unregistered:				
Steamers	1	.....	1	.....
Sailing vessels	73	10	83	.....
Unrigged	29	.....	29	.....
Total	576	49	625	183,658

¹ Includes \$15,000 appropriated by river and harbor act of July 27, 1916, for maintenance.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	116,835 short tons.....	116,835	\$393,263.81
Lumber.....	6,450,583 feet.....	9,546	130,415.90
Railroad ties.....	28,272.....	2,120	17,811.00
Laths.....	1,544,200.....	386	6,606.18
Shingles.....	2,085,000.....	287	15,974.92
Stone.....	3,500 cubic yards.....	7,560	10,500.00
Do.....	7,275 short tons.....	7,275	16,337.50
Riprap.....	1,000 short tons.....	1,000	3,000.00
Oil.....	226,069 gallons.....	825	7,000.00
Lime.....	3,286 barrels.....	329	3,351.72
Sand.....	329 short tons.....	329	411.25
Rollers.....	600 short tons.....	600	90,000.00
Engines.....	75 short tons.....	75	60,000.00
Piles.....	180,000 feet.....	882	18,000.00
Steel chains, anchors, etc.....	100 short tons.....	100	4,000.00
Total.....	.....	148,149	976,695.28

(B) WEYMOUTH BACK RIVER.

No operations were in progress and no expenditures made.

APPROPRIATIONS.

Aug. 18, 1894	\$2, 500. 00
June 3, 1896	10, 000. 00
Mar. 2, 1907	9, 500. 00
June 25, 1910	5, 000. 00
Total	27, 000. 00
Receipts from sales	. 15
	27, 000. 15

COMMERCIAL STATISTICS.

Articles.	1911	1912	1913	1914
	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>	<i>Short tons.</i>
Machinery.....			540	
Iron castings.....			250	
Pyrites.....			6,324	
Concrete material.....			12,000	
Roofing material.....			875	
Coal.....	7,835	7,699	5,994	8,796
Cinder.....		10,702	1,625	
Raw and manufactured fertilizer products.....	190,908	214,018	154,780	237,133
Lumber.....	906	210	6,000	
Brick.....	25	96	350	
Stone.....	1,675	327	571	300
Grease.....	430	609	461	
Burlaps.....	577	410	740	
Barrels and barrel stock.....		1,148	322	
Steel.....	125	60	600	150
Lead.....	10	10	110	
Iron.....	250	250	300	750
Oil.....	20	25	28	30
Lime.....	17	8	5	5
Cement.....	462	230	81	115
Clay.....	3			
Bags.....	1,350	1,606	1,785	
Twine.....	8	12	15	
Oyster shells.....		42		
Meat meal.....		42		
Beef scrap.....		194	386	
Plaster.....		4,296	1,393	
Brick tile.....				12
Miscellaneous.....				9,915
Total.....	204,625	241,984	196,125	257,206

Vessel classification, 1915.

Classes.	American.	Total net registered tonnage.
Registered:		
Steamers.....	10	14,680
Sailing vessels.....	87	6,102
Barges.....	63	26,782
Unregistered unrigged lighters.....	720	.....
Total.....	860	46,544

This does not include a tug and 11 barges continuously employed by the owners in towing raw materials and manufactured products to and from the fertilizer factory.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	8,098 short tons.....	8,098	\$22,611
Lumber.....	300,000 feet.....	150	9,000
Brick.....	82,400.....	206	988
Cinder.....	5,467 short tons.....	5,467	4,467
Twine.....	15 short tons.....	15	3,600
Steel.....	800 short tons.....	100	7,000
Lead.....	150 short tons.....	140	14,600
Castings.....	78 short tons.....	75	5,250
Iron.....	250 short tons.....	250	11,250
Oil.....	8,000 gallons.....	30	2,400
Bags.....	2,199,450.....	1,059	131,997
Silk.....	15 short tons.....	15	75
Barley.....	1,440,000 yards.....	460	72,000
Barrels.....	5,000.....	40	1,250
Beef cake.....	221 short tons.....	221	9,945
Flour.....	912 short tons.....	912	2,736
Lime.....	4,822 short tons.....	4,822	14,586
Cement.....	1,000 barrels.....	210	1,575
Machinery.....	250 short tons.....	250	10,000
Fertilizer and fertilizing material.....	183,173 short tons.....	183,173	4,280,018
Total.....	.....	206,323	4,616,218

The United States naval magazine is located at Hingham and utilizes the river for the transportation of ammunition.

12. PLYMOUTH AND PROVINCETOWN HARBORS, MASS.

(A) PLYMOUTH HARBOR.

During the fiscal year, under contract with Eugene Breymann, 30,959 cubic yards of mud and sand were removed from the 18-foot channel and basin, completing the improvement; expenditure, \$17,950.24. Under written order and acceptance Eugene Breymann dredged 60,598 cubic yards of clay, mud, and sand, and 11.3125 cubic yards of bowlders from the old 9-foot turning basin in deepening it to 15 feet, and 3,024 cubic yards from a strip 60 feet wide along the outer edge in deepening it to 18 feet; expenditure, \$8,802.76. Unit price, 11½ cents per cubic yard. The total expenditures were \$26,753.10.

APPROPRIATIONS.

	Previous projects.	Existing projects.		Total.
		Beach protection.	18-foot channel.	
Act of—				
1824-1892 (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 527).....	\$188,081.90			\$188,081.90
Aug. 18, 1894.....	960.00	\$550.00		1,500.00
June 3, 1896.....		1,500.00		1,500.00
Mar. 3, 1899.....	10,000.00	75,000.00		85,000.00
June 13, 1902 (allotment Aug. 28, 1902).....	3,877.90	128.10		4,000.00
Mar. 3, 1900 (allotment Aug. 26, 1909).....		118,800.00		118,800.00
June 25, 1910.....	8,402.76	1,607.24		10,000.00
Mar. 4, 1913.....			\$83,500.00	83,500.00
Carried to surplus fund from 1842 to 1859, inclusive, and June 30, 1912.....	211,306.66	97,575.34	83,500.00	392,381.90
	90.16	331.94		422.10
Contributed funds:	211,216.40	97,243.40	83,500.00	391,960.80
By Commonwealth of Massachusetts, 1915.....	\$83,500			
Returned to Commonwealth, 1916.....	26,500			
	57,000			
By Plymouth Electric Light Co.	400			
	57,400			
Damages from surety of failing contractor.....	400.00		57,000.00	57,400.00
		4,530.12		4,530.12
Total.....	211,616.40	101,773.52	140,500.00	453,890.92

¹ \$19,500 allotted from appropriation for "Emergencies in river and harbor works," to which appropriation \$700 was restored on Oct. 30, 1911.

CONTRACT IN FORCE.

Contractor: Eugene Breyman, Toledo, Ohio.

Character and amount: For dredging about 853,900 cubic yards.

Unit price: 11½ cents per cubic yard.

Date of contract: February 28, 1914.

Date of approval: March 18, 1914.

Date fixed for commencement: Within 30 days after date of receipt of notification of approval.

Date fixed for completion: No definite date fixed; 20,000 cubic yards per month first two months, and 50,000 cubic yards per month thereafter.

Completed September 18, 1915.

COMMERCIAL STATISTICS.

Articles.	1911	1912	1913	1914
	Short tons.	Short tons.	Short tons.	Short tons.
Coal.....	46,267	35,320	36,287	43,527
Lumber.....	2,000	2,300	1,800	1,000
Miscellaneous.....	400	100	525	200
Total.....	48,667	37,720	38,612	45,127
Number of passengers carried.....	53,993	52,009	70,876	61,805

Vessel classification, 1915.

Classes.	American.	Total.	Total net registered tonnage.	Passenger carried.
Registered:				
Steamers.....	79	79	135,313	50,493
Sailing vessels.....	26	26	10,490	.....
Barges.....	8	8	6,861	.....
Unregistered sailing vessels.....	1	1	.....	.....
Total.....	114	114	52,664	50,493

¹ One steamer of 447 net tons, 79 round trips from Boston.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	34,878 short tons.....	34,878	\$177,992.56
Lumber.....	1,300,000 feet.....	1,950	37,000.00
Fruit and provisions.....	.....	36,828	214,992.56
Total.....	.....	275	(¹)
		37,108	(¹)

¹ Not ascertainable.

(B) PROVINCETOWN HARBOR.

No operations were in progress and no expenditures made.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 532)..... ¹	\$225,828.44
Existing project, June 25, 1910.....	140,000.00
Total of appropriations.....	365,828.44
Carried to surplus fund, 1828-1890, previous project.....	3,665.47
Net total.....	362,162.97

¹ Including appropriation of \$3,500 by act of Mar. 2, 1829.

IMPROVEMENT OF RIVERS AND HARBORS IN NEWPORT, R. I., DISTRICT.

REPORT OF COL. JOHN MILLIS, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Pollock Rip Shoals, Nantucket Sound, Mass.....	1909	9. Providence River and Harbor, R. I.....	1920
2. Hyannis Harbor, Mass.....	1910	10. Newport Harbor, R. I.....	1924
3. Harbor of Refuge at Nantucket, Mass.....	1911	11. Harbor of Refuge at Point Judith, R. I.....	1926
4. Woods Hole Channel, Mass.....	1913	12. Entrance to Point Judith Pond, R. I.....	1927
5. New Bedford and Fairhaven Harbors, Mass.....	1914	13. Harbor of Refuge at Block Island, R. I.....	1927
6. Taunton River, Mass.....	1916	14. Great Salt Pond, Block Island, R. I.....	1929
7. Fall River Harbor, Mass.....	1918		
8. Pawtucket (Seekonk) River, R. I.....	1919		

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 112 TO 142.

1. POLLOCK RIP SHOALS, NANTUCKET SOUND, MASS.

Between October 18 and 22, 1915, an examination of the channels through the shoals was made by the Government-owned suction dredge *Navesink*, which indicates that very little change has taken place during past year in the condition of either Stone Horse Shoal or the cut through the shoal connecting Bearse and Pollock Rip Shoals, although a considerable extension had occurred to a shoal near the intersection of the southeastern line of the proposed channel and the present sailing course between the Shovelful and Pollock Rip Light Vessels. About 10,490 cubic yards of sand were dredged from this shoal and from the Stone Horse Shoal. The total amount dredged from this locality is 2,327,502 cubic yards. The total expenditures on this work, including all contingencies, have been \$250,358.26, at the rate of 10.71 cents per cubic yard.

APPROPRIATIONS.

July 25, 1912.....	\$125,000.00
Mar. 4, 1913.....	125,000.00
July 27, 1916.....	150,000.00
Total of appropriations.....	400,000.00
Received from sale of material.....	858.26
Grand total.....	400,358.26

1909

2. HYANNIS HARBOR, MASS.

No works of improvement or maintenance were in progress during the fiscal year. The project is completed.

APPROPRIATIONS.

Mar. 2, 1827	\$10,650.00	Sept. 19, 1890	\$8,000.00
Apr. 23, 1830	6,517.82	July 13, 1892	6,000.00
Mar. 2, 1831	8,400.00	Aug. 18, 1894	3,500.00
July 3, 1832	7,600.00	June 3, 1896	6,000.00
Mar. 2, 1833	5,000.00	Mar. 3, 1899	2,162.00
June 28, 1834	10,000.00	June 13, 1902	20,000.00
Mar. 3, 1835	9,000.00	Mar. 3, 1905	8,173.25
Mar. 3, 1837	5,000.00	Mar. 4, 1913	24,000.00
July 7, 1838	8,764.00		
Aug. 30, 1852	5,000.00	Total of appropriations	221,267.07
July 11, 1870	12,000.00	Received from sale of material	20.68
Mar. 3, 1871	10,000.00	Received from bondsmen of failing contractor Jan. 18, 1906, act of June 13, 1902	500.00
Mar. 3, 1873	10,000.00		
June 23, 1874	5,000.00	Grand total	221,787.75
June 18, 1878	3,000.00		
Mar. 3, 1879	2,500.00		
Mar. 3, 1881	5,000.00		
Aug. 5, 1886	10,000.00		
Aug. 11, 1888	10,000.00		

COMMERCIAL STATISTICS.

The following statistics for the year 1915 relative to the commerce of the harbor at Hyannis, Mass., were compiled under the direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	Arrivals and departures.			Net registered tonnage.	Passengers.
	American.	Foreign.	Total.		
Registered:					
Steamers	7,165		7,165	119,700	2,700
Sailing	1,190	10	1,190	78,920	1,000
Barges	12		12	6,000	
Unregistered:					
Steamers	1,800		1,800	5,200	510
Sailing	600		600	3,110	85
Barges	63		63	10,469	
Total	10,809	10	10,819	223,330	4,295

Included with "Registered steamers" are 65 Government steamers, 25 tugs, 25 steam and power yachts, 275 freight-carrying motor vessels, and 6,775 motor fishing vessels.
 Included with "Registered sailing" are 210 large freight schooners, 600 small freight sloops and schooners and 370 sloop and schooner yachts. Also 10 foreign lumber schooners.
 Included with "Registered barges" are 12 coal barges.
 Included with "Unregistered steamers" are 1,800 small motor boats.
 Included with "Unregistered sailing" are 600 small sail boats.
 Included with "Unregistered barges" are 6 lighters, 6 dredges, and 40 scows.
 No transportation or regular vessel lines use the harbor.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal, anthracite.....	50 tons.....	56	\$287.50
Oil.....	34,554 gallons.....	121	4,011.82
Stone.....	2,000 tons.....	2,000	3,600.00
Fish and shellfish ¹	12,609 barrels.....	1,514	75,564.00
Logs and ties ²	4,000.....	200	1,320.00
Total.....		3,891	86,783.42
Increase over 1914.....		2,223	.....

¹ Included with "Fish and shellfish" are 12,559 barrels of mixed fish and 50 barrels of quahogs.

² Included with "Logs and ties" are 4,000 fence posts.

In addition to the local commerce given above, an estimated amount of 22,000 tons, having an estimated value of \$165,000, used Hyannis Harbor as a harbor of refuge.

3. HARBOR OF REFUGE AT NANTUCKET, MASS.

No works of improvement or maintenance were in progress during the fiscal year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 503) - \$45,834.75

Existing project:

July 14, 1880.....	\$50,000.00
Mar. 3, 1881.....	25,000.00
Aug. 2, 1882.....	25,000.00
July 5, 1884.....	10,000.00
Aug. 5, 1886.....	15,000.00
Aug. 11, 1888.....	20,000.00
Sept. 19, 1890.....	25,000.00
July 13, 1892.....	25,000.00
Aug. 18, 1894.....	25,000.00
June 3, 1896.....	20,000.00
Mar. 3, 1899.....	20,000.00
June 15, 1902 (allotted July 30, 1902).....	15,000.00
Mar. 3, 1905 (allotted Mar. 29, 1905).....	71,828.75
Mar. 2, 1907.....	42,500.00
Mar. 3, 1909 (allotted Apr. 10, 1909).....	20,000.00
June 25, 1910.....	50,000.00
Feb. 27, 1911.....	20,000.00
Mar. 4, 1913.....	51,312.00
July 27, 1916.....	10,000.00
	<hr/> 540,638.75
Total of appropriations.....	586,473.50

COMMERCIAL STATISTICS.

The following statistics for the year 1915, relative to the commerce of the harbor at Nantucket, Mass., were compiled under the direction of this office from various available sources.

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	American (arrivals and departures).	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	12,354	403,646	53,416
Sailing.....	565	16,360	1,080
Barges.....	1	174	.....
Unregistered:			
Steamers.....	3,350	6,700	6,700
Sailing.....	750	3,080	1,680
Barges.....	24	1,200	.....
Total.....	17,044	430,576	63,096

Included with "Registered steamers" are 480 steamers on regular lines, 25 Government steamers, 14 tugs, 1 steam lighter, 150 steam and motor yachts, 11,340 steam and motor fishing vessels, and 344 large motor freight and passenger boats.

Included with "Registered sailing" are 115 freight schooners, 150 sloop and schooner yachts, and 300 large sailboats.

Included with "Registered barges" is 1 coal barge.

Included with "Unregistered steamers" are 3,350 small motor boats.

Included with "Unregistered sailing" are 750 small sailboats.

Included with "Unregistered barges" are 24 lighters.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal:			
Anthracite.....	7,020 gross tons.....	7,862	\$42,115.00
Bituminous.....	1,540 gross tons.....	1,735	7,600.00
Lumber.....	875,000 feet b. m.....	1,312	21,875.00
Shingles.....	1,366,000.....	136	5,425.00
Cement.....	5,676 barrels.....	1,135	11,350.00
Bricks.....	40,000.....	80	350.00
Stone.....	600 tons.....	600	900.00
Oil.....	105,320 gallons.....	459	25,217.00
Other building material.....	25 tons.....	25	350.00
Fish and shellfish ¹	16,683 tons.....	16,683	\$24,500.00
Hay, grain, and feed.....	737 tons.....	737	29,500.00
Live stock.....	575 head.....	94	9,375.00
Fertilizer.....	470 tons.....	450	15,750.00
Merchandise ²	12,654 tons.....	12,654	1,265,400.00
Logs and ties.....	1,850.....	141	1,650.00
Miscellaneous ³	1,743 tons.....	1,743	39,790.00
Total.....		45,836	1,965,137.00
Increase over 1914.....		9,183	.....

¹ Included with "Fish and shellfish" are 82,750 barrels of quahogs, 33,000 barrels of mixed fish, and 3,509 bags of scallops.

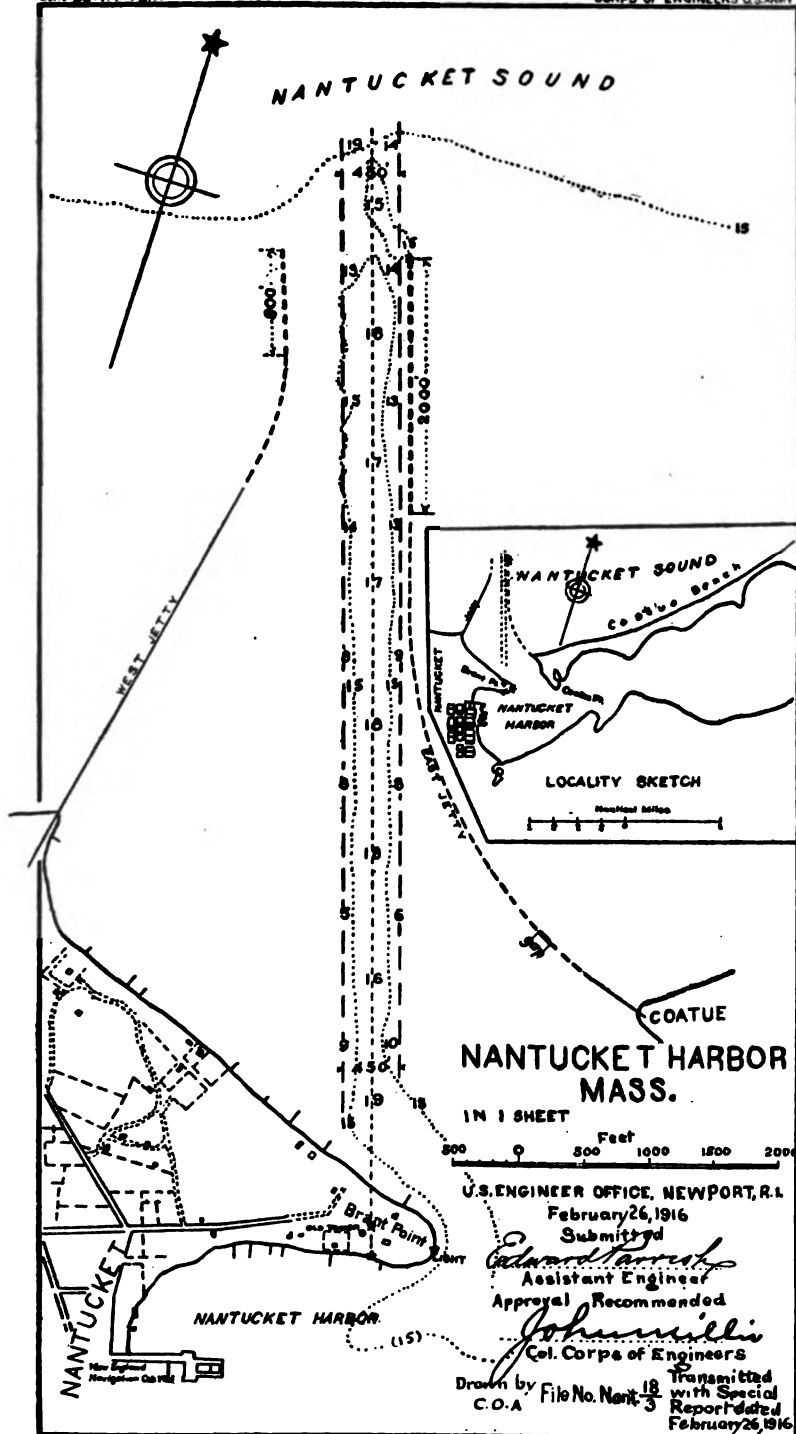
² Included with "Merchandise" are 12,654 tons of freight not classified carried on regular steamer lines and local vessels.

³ Included with "Miscellaneous" are 350 cords of wood, 250 tons of coals, 3,400 empty oil drums, 65,000 empty fish barrels, 150 tons of junk, 3,000 bushels of scallop shells, and 75 vehicles.

A large part of the increased tonnage for 1915 is due to more extensive operations by fishing vessels in ground fishing and dredging of quahogs from the recent discovered beds in Nantucket Sound.

About 36 per cent of the tonnage is fish and shellfish carried chiefly in vessels from 3 to 14 feet draft.

Practically all of the general merchandise, about 27 per cent of the tonnage, is carried in regular line steamers with a draft of from 6 to 9.5 feet.



4. WOODS HOLE CHANNEL, MASS.

No works of improvement or maintenance were in progress during the fiscal year. The project is completed.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 581) -	\$114,000.00
Existing project:	
June 3, 1896	\$20,000.00
Mar. 3, 1899	20,000.00
June 13, 1902	20,000.00
Mar. 3, 1905	70,000.00
June 30, 1906	100,000.00
	<hr/> 290,000.00
Total of appropriations	344,000.00
Returned to surplus fund of Treasury	400.08
Net total	<hr/> 343,599.92

COMMERCIAL STATISTICS.

The following statistics for the year 1915, relative to the commerce of the Woods Hole Channel, Mass., were compiled under the direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	American (arrivals and departures).	Net regis- tered ton- nage.	Passengers.
Registered:			
Steamers	7,972	973,690	199,785
Sailing	75	5,325	75
Barges	6	3,000	.....
Unregistered:			
Steamers	1,800	7,200	1,800
Sailing	52	208	52
Barges	52	9,300	.....
Total	<hr/> 9,957	<hr/> 998,713	<hr/> 201,712

Included with "Registered steamers" are 1,696 steamers on regular line, 886 Government steamers, 228 tug, 240 steam and motor freight carriers, 900 steam and motor yachts, 1,020 small passenger steamers, and 2,300 steam and motor fishing vessels.

Included with "Registered sailing" are 50 freight sloops and schooners and 25 sloop and schooner yachts.

Included with "Registered barges" are 6 coal and stone barges.

Included with "Unregistered steamers" are 1,800 small motor boats.

Included with "Unregistered sailing" are 52 small sailboats.

Included with "Unregistered barges" are 25 lighters, 6 dredges, and 20 scows.

It is estimated 150 motor fishing vessels with a net tonnage of 2,000 tons used Woods Hole Channel en route to and from the Cape Cod Canal.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal:			
Anthracite.....	3,923 gross tons.	4,396	\$36,900.00
Bituminous.....	1,423 gross tons.	1,596	6,698.00
Lumber.....	1,320,000 feet b. m.	1,950	23,740.00
Shingles.....	1,235,000.	123	4,940.00
Cement.....	4,300 barrels.	1,660	26,600.00
Bricks.....	40,000.	80	280.00
Stone.....	10,322 tons.	10,322	20,378.00
Oil.....	572,150 gallons.	1,389	98,332.50
Other building material.....	197 tons.	197	5,790.00
Fish and shellfish ¹	14,076 tons.	14,076	\$13,345.00
Salt.....	126 tons.	126	1,600.00
Hay, feed, and grain.....	555 tons.	555	20,625.00
Live stock.....	350 head.	137	17,600.00
Fertilizer.....	630 tons.	630	22,050.00
Manufactured iron and steel ²	300 tons.	300	30,000.00
Merchandise ³	20,681 tons.	20,681	2,068,160.00
Logs and ties ⁴	380.	135	10,420.00
Miscellaneous ⁵	1,224 tons.	1,224	\$27,400.00
Total.....		59,925	3,714,068.50
Increase over 1914.....		14,540	

¹ Included with "Fish and shellfish" are 82,000 barrels of quahogs, 24,000 barrels of mixed fish, 100 barrels of lobsters, and 20,533 pounds of cod.

² Included with "Manufactured iron and steel" are 300 tons of buoys, anchors, and chains.

³ Included with "Merchandise" are 20,681 tons of freight, not classified, carried on regular steamer lines and local vessels.

⁴ Included with "Logs and ties" are 300 spar markers and 80 piles.

⁵ Included with "Miscellaneous" are 800 automobiles, 100 vehicles, 3,000 empty salt barrels and 2,400 empty oil drums.

The total commerce is estimated as 18,265 tons, having an estimated value of \$596,956. Commerce passing through Woods Hole Strait is estimated as 41,660 tons, having an estimated value of \$3,117,112.

5. NEW BEDFORD AND FAIRHAVEN HARBORS, MASS.

A contract was entered into with the Bay State Dredging & Contracting Co., of Boston, Mass., under date of April 11, 1916, for the removal of the ledge rock in the anchorage area just north of Palmer Island and completing the dredging in that area. Work under this contract was commenced on May 3 and was in progress at the close of the fiscal year. Up to that time 76,249 cubic yards of mud, sand, and gravel and 31,432 cubic yards of bowlders exceeding $1\frac{1}{2}$ cubic yards each had been removed; practically all of the material overlying the ledge rock had been removed and the blasting of the ledge had been carried on over about 20 per cent of its area.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p 504) - \$170,700.00

Existing project:

Mar. 2, 1907.....	\$100,000.00
May 27, 1908.....	200,000.00
June 25, 1910.....	50,000.00
Feb. 27, 1911.....	50,000.00
July 25, 1912.....	(¹)

¹ \$56,610 for Acushnet River Channel transferred, under act of Mar. 4, 1915, to work on 25-foot channel to New Bedford and Fairhaven.

Existing project—Continued.

Aug. 24, 1912	\$127, 000. 00
Mar. 4, 1915 (transferred and allotted Apr. 2, 1915)	56, 610. 00
	<u>\$583, 610. 00</u>
Total appropriations	754, 810. 00
Received from sale of material	41. 28
Grand total	<u>754, 851. 28</u>

CONTRACT IN FORCE.

Contractor: Bay State Dredging & Contracting Co.

Date of contract: April 11, 1916.

Date of approval: April 26, 1916.

Date to commence: Area A, May 18, 1916; area B, May 18, 1916.

Date to complete: Area A, April 17, 1917; area B, December 15, 1916.

Amount of contract: 4,887.5 cubic yards rock removal; 173,000 cubic yards dredging.

Character of work: Dredging and rock removal.

Unit prices: Dredging, 14.9 cents per cubic yard, scow measurement; rock removal, \$3.25 per cubic yard, place measurement.

Completed at end of June, 1916: 35 per cent.

COMMERCIAL STATISTICS.

The following statistics for the year 1915, relative to the commerce of harbors at New Bedford and Fairhaven, Mass., were compiled under the direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	Arrivals and departures.			Net registered tonnage.	Passengers.
	American.	Foreign.	Total.		
Registered:					
Steamers	9, 413		9, 413	1, 397, 778	234, 376
Sailing	730	21	751	126, 052	3, 974
Barges	1, 314		1, 314	1, 302, 500	
Unregistered:					
Steamers	5, 975		5, 975	23, 900	17, 925
Sailing	240		240	1, 440	4, 080
Barges	108		108	42, 000	
Total	17, 962	21	17, 983	2, 891, 270	247, 355

Included with "Registered steamers" are 1,286 steamers on regular lines, 1,263 tugs, 200 Government steamers, 168 steam yachts, 48 large freight steamers, 80 steam lighters, 23 sailing steamers, and 6,360 large motor fishing, freight, and pleasure boats.

Included with "Registered sailing" are 215 large freight and whaling schooners and Portuguese packets, 9 barkes, 6 brigs, 281 sloop and schooner yachts, and 240 large sailboats.

Included with "Registered barges" are 1,301 large freight barges and 15 lighters.

Included with "Unregistered steamers" are 5,975 small motor boats.

Included with "Unregistered sailing" are 360 small sailboats.

Included with "Unregistered barges" are 15 dredges, 54 lighters, and 90 large scows.

During the year 177 large schooners, tugs, and barges, estimated tonnage of 119,475 net tons, using the Cape Cod Canal, made New Bedford a port of call.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal: ¹			
Anthracite.....	322,465 gross tons.....	361,161	\$1,959,793.15
Bituminous.....	765,754 gross tons.....	867,645	3,215,793.84
Cotton.....	241,673 bales.....	60,418	19,817,186.00
Lumber ²	10,706,292 feet, b. m.....	17,226	255,745.70
Shingles.....	6,984,000.....	698	21,010.35
Cement.....	7,510 barrels.....	1,502	15,190.00
Bricks.....	906,000.....	1,512	6,542.00
Stones.....	11,224 tons.....	11,224	13,870.00
Sand and gravel.....	3,182 tons.....	3,182	9,051.00
Oil ³	5,663,786 gallons.....	10,799	539,004.57
Other building material.....	30 tons.....	30	445.00
Fish and shellfish ⁴	41,880 tons.....	41,880	1,783,982.50
Hay, feed, grain.....	1,388 tons.....	1,388	53,500.00
Live stock.....	655 head.....	224	52,375.00
Fertilizer.....	888 tons.....	888	29,763.00
Manufactured iron and steel ⁵	1,286 tons.....	1,286	156,268.00
Merchandise ⁶	239,020 tons.....	239,020	23,601,950.00
Logs and ties.....	19,174.....	1,657	19,494.56
Miscellaneous ⁷	3,186 tons.....	3,186	857,728.22
Total.....		1,626,226	52,408,202.90
Increase over 1914.....		165,441.5	

¹ Included with "Coal" are 435,900 gross tons of coal in steamers, barges, and schooners, which used New Bedford Harbor en route to eastern ports.

² Included with "Lumber" are 8,123,292 feet b. m. of timber, planks, and boards, and 3,444,000 laths.

³ Included with "Oil" are 524,900 gallons of sperm oil, 91,000 gallons cordage oil, and 1,514,160 gallons of gas oil.

⁴ Included with "Fish and shellfish" are 4,428,000 pounds of mixed fish and 278,257 barrels of shellfish consisting mostly of quahogs.

⁵ Included with "Manufactured iron and steel" are 12,128 steel oil drums, 500 tons of water pipe, and 261 tons of buoys, anchors, and chain.

⁶ Included with "Merchandise" are 237,252 tons of freight not classified carried on regular steamer lines and local vessels and 1,768 tons of freight carried on whalers and vessels engaged in foreign trade.

⁷ Included with "Miscellaneous" are 792 automobiles, 99 vehicles, 975,910 wood blocks, 134 empty oil barrels, 30,026 bushels of oyster shells, and 300 tons of tile.

It is estimated that about 80 per cent of the total tonnage of the harbor uses the improved portion, the remaining 20 per cent consisting mostly of barges and schooners in the lower harbor waiting for tows or favorable wind for other points of destination.

About 75 per cent of the tonnage is coal carried in steamers and barges with a loaded draft of 11 to 22 feet.

About 17 per cent of the tonnage is general merchandise carried chiefly in regular line steamers of 13 to 15 feet loaded draft.

6. TAUNTON RIVER, MASS.

No works of improvement or maintenance were in progress during the fiscal year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 562) -- \$63,000.00

Existing project:

June 14, 1880.....	\$17,500.00
Mar. 3, 1881.....	25,000.00
Aug. 2, 1882.....	25,000.00
July 5, 1884.....	26,500.00
Sept. 19, 1890.....	7,000.00
July 13, 1892.....	7,000.00
Aug. 18, 1894.....	5,000.00
June 3, 1896.....	5,000.00
Mar. 8, 1899.....	7,000.00

Existing project—Continued.

June 13, 1902	\$5,000.00
Mar. 3, 1905	5,000.00
Mar. 3, 1909 (allotted Mar. 29, 1909)	5,000.00
June 25, 1910	5,000.00
Feb. 27, 1911	5,000.00
	\$150,000.00
Total of appropriations	213,000.00
Returned to surplus fund of Treasury, 1913	2,810.82
Net total	210,189.18
Received from sale of material	2.25
Grand total	210,191.43

COMMERCIAL STATISTICS.

The following statistics for the year 1915, relative to the commerce of the Taunton River, Mass., were compiled under the direction of this office from various sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	Total arrivals and departures.	Net registered tonnage.	Passengers.
Registered:			
Steamers	371	12,375	896
Sailing	42	4,253	
Barges	175	54,947	
Unregistered:			
Steamers	3,356	9,642	10,068
Sailing	400	500	1,500
Barges	9	535	
Total	4,333	82,152	12,463

Included with "Registered steamers" are 254 tugs, 70 freight steamers and large motor boats, 1 Government vessel, 39 excursion vessels, 4 oyster boats.

Included with "Registered sailing" are 42 large freight schooners.

Included with "Unregistered steamers" are 3,356 small motor boats.

Included with "Unregistered sailing" are 400 small sailboats.

Included with "Unregistered barges" are 9 freight lighters.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal, anthracite	25,821 tons	28,925	\$153,480
Coal, bituminous	55,464 tons	62,125	219,124
Lumber	320,000 feet	480	5,100
Shingles	200,000	46	600
Cement	75 barrels	15	90
Bricks	10,000	30	45
Oysters	10,400 bushels	301	3,640
Oyster shells	30,000 bushels	750	2,400
Hay, feed, and grain	152 tons	152	4,551
Live stock	2 head	1	300
Fertilizer	50 tons	50	1,650
Miscellaneous ¹	15,103 tons	15,103	60,051
Total		107,068	454,011
Increase over 1914		2,955	

¹ Included with "Miscellaneous" are 9,117 tons fire clay, 2,735 tons molding sand, 580 cords firewood, 2,417 empty barrels, and 19,000 fire bricks.

Practically all of the freight-carrying vessels on this river have a loaded depth of from 7 to 9 feet.

7. FALL RIVER HARBOR, MASS.

The work of maintenance dredging in the approach channel and on the eastern side of the harbor was commenced by the U. S. suction dredge *Gedney* on October 17 and continued until December 31, 1915, when it was completed. During this period 71,902 cubic yards of sand, gravel, and mud were removed.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 450).....	\$30,000.00
Existing project:	
Mar. 3, 1899.....	\$20,000.00
June 13, 1902.....	38,000.00
Mar. 3, 1903.....	117,412.00
Mar. 3, 1905.....	500.00
Mar. 3, 1909.....	20,000.00
June 25, 1910.....	13,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	12,000.00
	380,912.00
Total of appropriations.....	380,912.00
Returned to surplus fund of Treasury.....	.51
Net total of appropriations.....	380,911.49
Received from sale of material.....	18.35
Grand total.....	380,929.84

COMMERCIAL STATISTICS.

The following statistics for the year 1915, relative to the commerce of the harbor at Fall River, Mass., were compiled under the direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	Arrivals and departures.			Net registered tonnage.	Passengers.
	American.	Foreign.	Total.		
Registered:					
Steamers.....	3,330	1	3,331	1,694,573	306,306
Sailing.....	101	4	105	15,365	.....
Barges.....	765	.....	765	445,543	.....
Unregistered:					
Steamers.....	5,183	.....	5,183	19,138	16,000
Sailing.....	648	.....	648	1,824	5,000
Barges.....	8	.....	8	520	.....
Total.....	10,024	5	10,029	2,377,307	345,296

Included with "Registered steamers" are 1,004 steamers on regular lines, 29 steam colliers, 68 steam lighters, 278 steam and large motor freight vessels, 1,329 tugs, 14 steam and motor yachts, 196 Government vessels, 257 steam and motor excursion vessels, 213 steam and motor oyster boats, 48 steam and motor fishing vessels.

Included with "Registered sailing" are 497 large freight schooners.

Included with "Registered barges" are 456 sailing barges, 2 whaleback barges, 307 unpowered barges.

Included with "Unregistered steamers" are 5,183 pleasure motor boats.

Included with "Unregistered sailing" are 648 small pleasure sail boats.

Included with "Unregistered barges" are 8 freight lighters.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal, anthracite.....	139,521 tons.	156,269	\$743,119
Coal, bituminous.....	615,862 tons.	689,770	2,132,870
Cotton.....	131,693 bales.....	32,992	8,245,000
Lumber ¹	9,319,398 feet.....	13,969	224,573
Shingles.....	1,379,000.....	317	4,137
Cement.....	15,075 barrels.....	3,015	17,805
Bricks.....	1,243,500.....	1,458	5,494
Stone.....	1,200 tons.....	1,200	4,800
Sand and gravel.....	690 cubic yards.....	992	792
Oil.....	2,206,564 gallons.....	7,160	227,970
Other building material ²	850 tons.....	850	6,379
Oysters.....	77,400 bushels.....	2,248	27,840
Oyster shells.....	86,000 bushels.....	2,230	6,250
Hay, feed, grain.....	3,422 tons.....	3,422	102,651
Live stock.....	323 head.....	161	45,450
Fertilizer.....	149 tons.....	149	4,917
Manufactured iron and steel ³	1,822 tons.....	1,822	137,725
Merchandise ⁴	403,742 tons.....	403,742	40,342,549
Logs, ties, piles ⁵	12,140.....	607	8,508
Miscellaneous ⁶	71,281 tons.....	71,281	5,643,436
Total.....		1,893,654	57,838,257
Decrease under 1914.....		34,145	

¹ Included with "Lumber" are 4,090,798 feet of spruce, 824,571 feet of hemlock, 2,382,561 feet of yellow pine, 1,223,895 feet of cypress, 425,074 feet of white pine, 372,500 feet unclassified.

² Included with "Other building materials" are 11,586 bags of plaster, 2½ tons of roofing material, 336,000 lbs.

³ Included with "Manufactured iron and steel" are 593 tons of cast-iron pipe, 1,229 tons unclassified.

⁴ Included with "Merchandise" are 7,692 bales of waste, 401,611 tons unclassified.

⁵ Included with "Logs, ties, piles" are 12,140 tals.

⁶ Included with "Miscellaneous" are 5,000 barrels of fish, 2,340 barrels of shellfish, 10,211 tons of fire clay, 19,000 fire bricks, 3,064 tons of molding sand, 580 cords of wood, 2,417 empty barrels, 65,368 tons unclassified.

The above figures include 107,968 tons, having a value of \$454,011, to and from Taunton River and passing through Fall River Harbor, Mass.

All the freight traffic in this harbor uses the improved portions. About 60 per cent of the total tonnage is coal carried in colliers and barges of from 12 to 23 feet loaded draft. About 29 per cent of total tonnage is general merchandise carried chiefly in regular line steamers of from 13 to 15 feet loaded draft.

8. PAWTUCKET (SEEKONK) RIVER, R. I.

No works of improvement or maintenance were in progress during the year.

APPROPRIATIONS.

BY THE UNITED STATES.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 523) — \$336,000. 00

Existing project:

Mar. 3, 1905.....	\$30,000. 00	
Mar. 2, 1907.....	135,584. 00	
Feb. 27, 1911.....	5,000. 00	
		170,584. 00
Total of appropriations.....		506,584. 00

CONTRIBUTED FUNDS.

Contributed by State of Rhode Island.....	67,792. 00
Total of United States and contributed funds.....	574,376. 00
Received from sale of material.....	51. 47
Grand total.....	574,427. 47

COMMERCIAL STATISTICS.

The following statistics for the year 1915 relative to the commerce of Pawtucket River, R. I., were compiled under the direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	Arrivals and departures.			Net registered tonnage.	Passengers.
	American.	Foreign.	Total.		
Registered:					
Steamers.....	3,832		3,832	164,451	50,810
Sailing.....	126		126	18,900	
Barges.....	565		565	282,500	
Unregistered:					
Steamers.....	3,000		3,000	12,000	15,000
Sailing.....	90		90	360	480
Barges.....	300		300	15,000	
Total.....	7,913		7,913	483,211	66,290

Included with "Registered steamers" are 98 passenger steamers, 1,814 oyster steamers, 862 tugs, 105 freight steamers, and 953 large launches.

Included with "Registered sailing" are 96 freight schooners, and 30 large sailboats.

Included with "Unregistered steamers" are 3,000 (estimated) small motor boats.

Included with "Unregistered sailing" are 90 (estimated) small sailboats.

Included with "Unregistered barges" are 300 (estimated) small scows, etc., with miscellaneous freight.

It is estimated that 54.2 per cent of the registered vessels, with a draft of 7 to 15 feet and a net registered tonnage of 252,491 tons, used the improved part of Pawtucket River. It is estimated that 75 per cent of the unregistered vessels, with a draft of 2 to 7 feet and a net registered tonnage of 20,520 tons, used the improved portion of Pawtucket River.

Freight traffic.

Articles.	Amount in customary unit.	Amount in short tons.	Valuation.
Coal:			
Anthracite.....	95,534 long tons.....	106,998	554,697.20
Bituminous.....	162,424 long tons.....	181,915	609,090.00
Oil.....	22,056,662 gallons.....	72,447	1,370,639.80
Lumber.....	3,888,928 feet b. m.....	5,056	86,217.53
Shingles.....	3,395,250.....	707	10,185.75
Brick.....	1,377,300.....	2,755	11,020.00
Other building material ¹	1,338 tons.....	1,338	5,543.00
Manufactured iron and steel.....	20,197 tons.....	20,197	538,456.34
Other products ²	6,140 tons.....	6,140	2,024,867.65
Other produce ³	60,809 tons.....	60,809	467,738.00
Total.....		458,362	5,677,875.99
Decrease under 1914.....		18,950	

¹ Included with "Other building material" are 82 tons of fire brick, 18 tons of fire clay, 266 tons of laths, etc.

² Included with "Other products" are 4,213 tons of copper bars and 1,207 tons of wire scrap.

³ Included with "Other produce" are 1,848,223 bushels of oysters and oyster shells.

Of the total tonnage about 69 per cent was carried over the improved portion of the river.

9. PROVIDENCE RIVER AND HARBOR, R. I.

The work of dredging to 30 feet depth in the approach channel between Bullocks Point Lighthouse and Fields Point, a distance of about 3½ miles, under the contract dated July 21, 1914, with the J. S. Packard Dredging Co., of Providence, R. I., was continued until November 27, 1915, and from May 1-3, 1916, when the contract was completed and the channel given the full projected width

and depth. The total amount dredged during the fiscal year, including final corrections for deductions, was 999,366 cubic yards and 32,402 cubic yards of bowlders exceeding $1\frac{1}{2}$ cubic yards each. The total excavation under the contract was 3,055,438 cubic yards, scow measurement, at 7.98 cents per cubic yard, and 32,402 cubic yards of bowlders at \$8 per cubic yard.

The work of dredging to 25 feet depth on the triangular shoal area along the easterly harbor line of Providence Harbor just north of Kettle Point under the contract dated April 14, 1915, with P. Sanford Ross (Inc.), in progress at the beginning of the fiscal year was continued until October 2, 1915, when it was suspended for the winter and resumed on May 4, 1916, and was in progress at the close of the fiscal year. The work under this contract embraces two subdivisions. Subdivision A is of hard material, the contract price for which is 30 cents per cubic yard in place. Subdivision B is of mud, the contract price for which is $10\frac{1}{2}$ cents per cubic yard in place, with a price of \$8 per cubic yard for bowlders exceeding $1\frac{1}{2}$ cubic yards each, if found. Up to the close of the fiscal year there had been removed from subdivision A 186,912 cubic yards, place measurement, at full price and 3,969 cubic yards between the depths of 25 and 27 feet mean low water at half price, nearly completing that subdivision, and from subdivision B about 175,958 cubic yards, place measurement. The contract is about 76 per cent completed.

Under date of April 17, 1916, an emergency contract was entered into with the J. S. Packard Dredging Co. for a small amount of dredging to connect the new State pier with the 30-foot depth of water on the eastern side of the harbor. Work under this contract was commenced on April 17 and completed April 26, 1916. There was dredged under this contract 28,945 cubic yards at full price, 14.9 cents per cubic yard, and 7,560 cubic yards at half price between the depths of 30 and 32 feet at mean low water.

The U. S. suction dredge *Gedney* worked at the northerly end of Providence Harbor from July 1 to September 30 dredging to 30 feet depth at mean low water and removed 42,445 cubic yards of mud at a field cost of 16.86 cents per cubic yard.

The U. S. suction dredge *Navesink* worked along the easterly side of Providence Harbor in an area about 320 feet wide, making a depth of 30 feet at mean low water over the greater part of the area between July 1 and October 15 and November 1 and December 31, 1915, removing 523,718 cubic yards of mud and sand at a field cost of 7.84 cents per cubic yard.

Formed upon the suggestion of the district officer that it would be advantageous to harmonize the numerous interests concerned in the harbor with a view to working out a general plan for harbor development that would be consistent with the best conditions and acceptable to all, the Providence Chamber of Commerce took the initiative in carrying out the suggestion and the Metropolitan Terminal Development Commission was organized for this purpose on January 9, 1915. This consisted of representatives from the following:

- The Rhode Island State Harbor Improvement Commission.
- The Rhode Island State Harbor Commission.
- The Seekonk River Commission.
- The Rhode Island State Public Utilities Commission.

The Metropolitan Park Commission.
 The city of Providence.
 The city of Pawtucket.
 The city of Cranston.
 The town of East Providence.
 The Providence City Plan Commission.
 The New York, New Haven & Hartford Railroad Co.
 The Southern New England Railway Co.
 The Merchants & Miners' Transportation Co.
 The Colonial Line.
 The New England Steamship Co.
 The Fabre Line.
 The Bay State Line.
 The Providence Chamber of Commerce.

Numerous public hearings, conferences, and discussions were held and some 10 different plans for modifications and extensions of the harbor lines and for dredging directly connected with the harbor were submitted and considered. Finally a general plan was adopted on January 20, 1916, which was the subject of a special report by the district officer under the general instructions contained in the fourth indorsement, O. C. E., April 30, 1915 (E. D. 78964-220), which was submitted May 15, 1916.

APPROPRIATIONS.

PROVIDENCE RIVER AND HARBOR AND NARRAGANSETT BAY.

Previous projects, including Green Jacket Shoal (H. Doc. No. 421, 57th Cong., 2d sess., p. 312)-----	\$2, 481, 327. 00
Existing projects and previous projects:	
June 25, 1910-----	¹ \$20, 000. 00
Mar. 4, 1913-----	264, 800. 00
Aug. 1, 1914-----	500, 000. 00
July 1, 1916-----	327, 800. 00
	<hr/> 1, 112, 600. 00
Total -----	3, 593, 927. 00
Returned to surplus fund of Treasury -----	7, 174. 06
	<hr/> 3, 586, 752. 04
Net total of appropriations-----	
Received from sale of material, previous projects-----	\$150. 62
Received by reimbursement from Col. W. R. Livermore-----	8. 48
Received from sale of material, present project-----	1, 068. 69
	<hr/> 1, 227. 79
Grand total-----	3, 587, 980. 73

CONTRACTS IN FORCE.

Contractor: J. S. Packard Dredging Co.
 Amount and character of work: Dredging 3,253,345 cubic yards of material.
 Rate per cubic yard: 7.98 cents.
 Date of approval: August 7, 1914.
 To commence: September 12, 1914.
 To complete: June 12, 1917.
 Completed.

¹ Appropriation \$75,000, including \$55,000 for previous projects.

Contractor: P. Sanford Rees (Inc.).
Amount of work: Section A, 222,196 cubic yards; section B, 239,756 cubic yards; total, 461,952 cubic yards.
Character of work: Dredging.
Rate per cubic yard: Section A, 30 cents; section B, 10½ cents.
Date of approval: April 24, 1915.
To commence: May 18, 1915.
To complete: August 18, 1916.
Percentage of completion at end of fiscal year June 30, 1916: 76.

Contractor: J. S. Packard Dredging Co.
Amount and character of work: 25,000 cubic yards of dredging.
Rate per cubic yard: 14.9 cents.
Date of approval: Emergency contract, not approved.
To commence: April 27, 1916.
To complete: May 15, 1916.
Completed.

COMMERCIAL STATISTICS.

The following statistics for the year 1915 relative to the commerce of Providence River and Harbor, R. I., were compiled under the direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	Arrivals and departures.			Net registered tonnage.	Passengers.
	American.	Foreign.	Total.		
Registered:					
Steamers.....	13,365	30	13,395	5,101,875	925,394
Sailing.....	355	11	366	150,000	1,830
Barges.....	1,821	.....	1,821	1,696,351	.....
Unregistered:					
Steamers.....	23,000	.....	23,000	92,000	115,000
Sailing.....	700	.....	700	2,800	3,500
Barges.....	1,500	.....	1,500	150,000	.....
Total.....	40,741	41	40,782	7,192,066	1,045,724

Included with "Registered steamers" are 3,778 steamers on regular lines, 3,714 oyster boats, 1,739 tugs, 450 steam yachts, 150 Government steamers, 124 colliers on regular lines, 172 freight steamers, 22 foreign trans-Atlantic steamships, 8 foreign and 15 American steamers carrying oil, etc., and 3,223 large pleasure and freight motor vessels.

Included with "Registered sailing" are 42 large coal-carrying schooners, 224 freight schooners, and 100 yachts.

Included with "Unregistered steamers" are 23,000 (estimated) small motor boats.

Included with "Unregistered sailing" are 700 (estimated) small sailboats.

Included with "Unregistered barges" are 1,500 (estimated) small scows, lighters, pile drivers, oyster scows, etc.

Of the registered vessels noted above, 65 per cent, with a net registered tonnage of 660,703 tons, are engaged in purely local business (i. e., within a radius of 50 miles of Providence) on a loaded draft of 5 to 14 feet; 30 per cent, with a net registered tonnage of 2,517,879 tons are engaged in traffic between Providence and New York Harbor, or points nearby, on a draft of 8 to 17 feet; 15 per cent, with a net registered tonnage of 2,768,704 are engaged in traffic to points requiring an ocean voyage, on a draft of 12 to 20 feet.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal:			
Anthracite.....	483,670 long tons.....	541,710	\$2,766,472.40
Bituminous.....	1,619,082 long tons.....	1,813,372	5,925,891.70
Oil.....	79,807,648 gallons.....	277,537	7,026,797.30
Cotton.....	268,080 bales.....	67,080	20,124,000.00
Lumber.....	12,557,748 feet.....	23,710	284,975.31
Shingles.....	3,995,250.....	832	11,965.75
Brick.....	3,572,300.....	7,145	28,580.00
Stone.....	3,298 tons.....	3,298	26,062.00
Sand and gravel.....	38,495 tons.....	38,495	52,719.00
Logs.....	2,546 tons.....	2,546	24,436.80
Other building material ¹	8,889 tons.....	8,889	111,992.15
Salt.....	5,460 tons.....	5,460	27,120.00
Hay, feed, and grain.....	6,632 tons.....	6,632	198,960.00
Live stock.....	755 head.....	176	47,600.00
Fertilizer.....	186 tons.....	186	4,650.00
Other produce ²	72,852 tons.....	72,852	582,280.75
Manufactured iron and steel ³	90,140 tons.....	90,140	2,088,486.34
Merchandise ⁴	743,380 tons.....	743,380	247,971,397.00
Miscellaneous ⁵	36,106 tons.....	36,106	3,349,881.17
Total.....		3,739,546	290,654,307.67
Decrease under 1914.....		364,863	.....

¹Included with "Other building material" are 1,066 tons of fire brick, 196 tons of fire clay, 2,621 tons of plaster, 2,300 tons of wooden blocks, 395 tons of cement, 266 tons of laths, 250 tons of flue lining, 119 tons of plaster boards, and 1,654 tons of miscellaneous building material.

²Included with "Other produce" are 2,215,100 bushels of oysters and oyster shells, 120 barrels of lobsters, and 5,280 barrels of fish.

³Included with "Manufactured iron and steel" are 8,678 tons of cast-iron pipe and 67,567 tons of pig iron.

⁴Included with "Merchandise" are 743,380 tons of unclassified freight carried on regular steamer lines, etc.

⁵Included with "Miscellaneous" are 500 tons of bone black, 19,091 tons of chemicals, 3,360 tons of logwood, 20,143 empty barrels, 4,213 tons of copper bars, 1,207 tons of wire scrap, 3,069 tons of asphalt, etc.

The above figures include 458,362 tons to and from Pawtucket River and freight from foreign ports which passed through Providence Harbor.

All of the freight traffic noted above used the improved portion of Providence River.

10. NEWPORT HARBOR, R. I.

The work of dredging and rock removal under the contract dated December 24, 1914, with the Coastwise Dredging Co., of Norfolk, Va., in progress at the beginning of the fiscal year was continued until November 12, 1915, when the contract was completed. Under this contract there was removed a total of 14,371.2 cubic yards of ledge rock with its overburden of clay, gravel, and hardpan at a cost of \$3.89 per cubic yard, clearing to full depth all of the areas covered by the contract.

Subsequent sweeping of portions of the harbor developed some areas slightly shoal in other parts of the harbor, and the U. S. suction dredge *Navesink* was used in the harbor January 3-6, 1916, to remove them. The dredge removed 6,725 cubic yards, but the depth of water, 18 feet at mean low water, was found to be insufficient to advantageously work the dredge.

The subject of anchorage areas in Newport Harbor was taken up at the request of local commercial interests July 30, 1915. This had become especially necessary on account of the congestion caused in the summer by yachts. Several public hearings were held and tenta-

tive maps discussed. At the close of the year a general agreement was reached and a map showing proposed anchorages and clear passages or fairways will shortly be submitted.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 506)		\$244, 841. 67
Existing project:		
Mar. 2, 1907	\$85, 000. 00	
May 27, 1908	112, 100. 00	
Mar. 4, 1909	58, 800. 00	
June 25, 1910	50, 000. 00	
Mar. 4, 1911	183, 000. 00	
		488, 900. 00
Total of appropriations	728, 741. 67	
Received from sale of material	198. 78	
Grand total	728, 940. 45	

CONTRACT IN FORCE.

Contractor: Coastwise Dredging Co.

Amount and character of work: 14,871.2 cubic yards of dredging and rock removal.

Rate per cubic yard: \$3.89.

Date of approval: January 18, 1915.

To commence: February 17, 1915.

To complete: May 16, 1916.

Completed.

COMMERCIAL STATISTICS.

The following statistics for the year 1915, relative to the commerce of the harbor at Newport, R. I., were compiled under the direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	Total arrivals and departures.	Net registered tonnage.	Passengers.
Registered:			
Steamers	16, 708	5, 174, 175	1, 224, 238
Sailing	961	23, 068	6, 810
Barges	338	90, 506	
Unregistered:			
Steamers	21, 080	108, 480	142, 000
Sailing	2, 000	10, 000	10, 000
Total	41, 022	5, 494, 219	1, 383, 048

Included with "Registered steamers" are 10,856 steamers on regular lines; 27 steamers on regular lines, for repairs; 135 regular freight steamers; 85 other freight steamers; 854 fishing steamers; 606 large steam and power yachts; 1,331 small steam and power yachts; 1,113 tugs; 210 power lighters; 626 destroyers and submarines; 800 other Government steamers.

Included with "Registered sailing" are 60 large freight and fishing vessels; 201 small freight and fishing vessels; 60 large yachts, and 621 small yachts.

Included with "Barges" are 288 barges and 60 small lighters.

Included with "Unregistered steamers" are 12,180 small power fishing boats and 8,860 small motor boats.

Included with "Unregistered sailing" are 2,000 small yachts and catboats.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal:			
Anthracite.....	70,774 gross tons.....	79,780	\$457,497.74
Bituminous.....	37,854 gross tons.....	42,477	161,572.22
Lumber.....	966,891 board feet.....	1,621	28,783.06
Shingles.....	2,253,000.....	221	10,138.50
Cement.....	3,450 bags.....	584	5,246.00
Bricks.....	1,152,000.....	2,491	9,214.25
Stone.....		8,330	11,816.26
Sand and gravel.....		29,457	34,903.87
Oil.....	1,650,639 gallons.....	5,449	126,137.75
Other building material.....		225	2,160.00
Oysters.....	1,897 barrels.....	168	7,000.00
Salt.....		7	70.00
Hay, grain, and feed.....		2,204	65,897.52
Live stock.....	631 head.....	408	88,565.00
Fertilizer.....		1,192	31,832.00
Manufactured iron and steel.....		1,105	30,458.00
Merchandise.....		28,583	2,858,300.00
Logs and ties.....	43,673.....	1,875	14,094.00
Miscellaneous.....		17,112	1,828,106.74
Total.....		223,174	5,761,963.51
Decrease from 1914.....		22,754	.....

Included with "Miscellaneous" are 1,791 tons of cord wood, 943 tons of cinders, 13,371 tons unclassified, 396 tons granite curb, 263 tons granite culls, 323 tons asphalt, 16 tons oil containers, and 9 tons of automobiles. In addition to the above, 36,152 carriages and automobiles and 7,854 head of live stock at a total estimated value of \$30,382,680 were carried on the Jamestown and Newport ferries.

In addition to the local commerce given above, it is estimated that vessels carrying a total of 364,067 tons, valued at \$43,448,809.36, passed through the harbor and used it as a harbor of refuge.

11. HARBOR OF REFUGE AT POINT JUDITH, R. I.

Under date of April 10, 1916, a contract was entered into with the Coast & Lakes Contracting Corporation for repairing the east arm of the main breakwater and the outer portion of the east shore arm breakwater. Work under this contract was commenced May 18 and was in progress at the close of the fiscal year. During May and June 7,463 tons of stone were placed near the westerly end of the east arm of the main breakwater, at a cost of \$2.48 per ton of 2,000 pounds.

A board of engineers to consider certain proposed modifications in the breakwater was convened under Special Orders, No. 8, Office Chief of Engineers, April 5, 1916. The board visited the site on May 18, 1916.

APPROPRIATIONS.

Sept. 19, 1890.....	\$75,000.00	June 25, 1910.....	\$175,000.00
July 13, 1892.....	75,000.00	Feb. 27, 1911.....	50,000.00
Mar. 3, 1893.....	100,000.00	Aug. 24, 1912.....	160,000.00
Aug. 18, 1894.....	100,000.00	June 23, 1913.....	290,000.00
Mar. 2, 1895.....	300,000.00	Mar. 4, 1915 (allotted	
June 11, 1896.....	300,000.00	Apr. 2, 1915).....	75,000.00
June 4, 1897.....	300,000.00		
June 13, 1902.....	100,000.00	Total of appropri-	
Mar. 3, 1905.....	100,000.00	ations.....	2,588,443.35
June 30, 1906.....	100,000.00	Received from sale of	
Mar. 2, 1907.....	100,000.00	material.....	509.54
May 27, 1908.....	170,000.00		
Mar. 2, 1907 (allotted		Grand total.....	2,588,952.89
Aug. 8, 1908).....	18,443.35		
Mar. 3, 1909 (allotted			
Mar. 29, 1909).....	10,000.00		

¹Allotment of \$10,000, of which \$1,556.65 was returned to Treasury.

CONTRACT IN FORCE.

Contractor: Coast & Lakes Contracting Corporation.
 Date of contract: April 10, 1916.
 Date of approval: April 19, 1916.
 Date to commence: May 9, 1916.
 Date to complete: Sept. 8, 1916.
 Amount of contract: \$49,600.
 Character of work: Breakwater repairs.
 Unit price: \$2.48 per short ton of stone in place in work.
 Completed at end of June, 1916: 37 per cent.

COMMERCIAL STATISTICS.

Records of the Coast Guard station at Point Judith, R. I., show that during the year 1915 the harbor was used by the following classes and number of vessels: Schooners, 405; sloops, 96; power boats, 144; yachts, 32; barges, 24; tugs, 11; dredge and scow, 1; steamers, 18; and Government vessels, 24.

12. ENTRANCE TO POINT JUDITH POND, R. I.

No works of improvement or maintenance were carried on during the fiscal year.

APPROPRIATIONS.

July 13, 1892.....	\$7,500
Aug. 18, 1894.....	2,500
Mar. 3, 1905.....	2,000
Mar. 2, 1907.....	8,000
Total of appropriations.....	20,000
Transferred by river and harbor act of Mar. 4, 1915.....	8,000
Grand total.....	12,000

13. HARBOR OF REFUGE AT BLOCK ISLAND, R. I.

Work under the contract dated July 1, 1915, with Charles M. Cole, of Fall River, Mass., for dredging to 15 feet depth at mean low water in the harbor was commenced July 14 and completed December 15, 1915. There was dredged under this contract 106,887 cubic yards of sand and clay at full price, 19½ cents per cubic yard, and 19,670 cubic yards at half price, between the depths of 15 and 17 feet at mean low water; also 268.527 cubic yards of bowlders exceeding 1½ cubic yards each at \$8 per cubic yard.

Under date of July 26, 1915, a contract was entered into with E. S. Belden & Sons, of Hartford, Conn., for rebuilding basin walls and repairing breakwaters. Work under this contract was started September 7, 1915, and was completed May 29, 1916. Operations were suspended between December 15 and May 1. The total stone placed under the contract was 2,183.18 short tons, at \$2.97 per ton, in rebuilding the walls of the inner basin; 1,116.7 short tons in

repairing main breakwater back of the steamboat wharf, at \$2.79 per ton; 1,502.59 short tons repairing the outer end of the main breakwater and outer harbor wall, at \$1.59 per ton.

The wreck of the small schooner *North Star* was removed from the inner basin November 11-12, 1915, under an agreement with Charles M. Cole, of Fall River, Mass., and sunk in the ocean in not less than 10 fathoms depth, for the sum of \$485.

APPROPRIATIONS.

July 11, 1870-----	\$30,000.00	June 13, 1902-----	\$30,000.00
Mar. 3, 1871-----	75,000.00	Mar. 3, 1905-----	50,000.00
June 10, 1872-----	50,000.00	Mar. 2, 1907-----	20,000.00
Mar. 3, 1873-----	50,000.00	Mar. 3, 1909 (allotment)---	12,500.00
June 23, 1874-----	20,000.00	June 25, 1910-----	12,500.00
Mar. 3, 1875-----	20,000.00	Feb. 27, 1911-----	12,500.00
Aug. 14, 1876-----	40,000.00	July 25, 1912-----	30,000.00
June 14, 1880-----	6,000.00	Mar. 4, 1913-----	50,000.00
Aug. 2, 1882-----	19,000.00		
July 5, 1884-----	15,000.00	Total of appropriations-----	636,391.17
Aug. 5, 1886-----	20,000.00	Returned to surplus fund	
Aug. 11, 1888-----	15,000.00	of Treasury-----	824.43
Sept. 19, 1890-----	15,000.00		
July 13, 1892-----	24,000.00	Net total-----	635,566.74
Aug. 18, 1894-----	2,500.00	Received from sale of material-----	209.96
June 3, 1896-----	5,000.00		
Mar. 3, 1899-----	10,000.00	Grand total-----	635,776.70
June 6, 1900 (emergency allotment)-----	12,391.17		

CONTRACTS IN FORCE.

Contractor: Charles M. Cole.

Amount and character of work: Dredging 84,160 cubic yards material.

Rate per cubic yard: 19½ cents.

Date of approval: July 12, 1915.

To commence: August 6, 1915.

To complete: April 12, 1916.

Completed.

Contractor: E. S. Belden & Sons.

Amount and character of work: 3,900 tons of stone for breakwater repairs.

Rate per ton: Inner basin, \$2.97 per ton; main breakwater, \$2.79 per ton; outer end main breakwater, \$1.59 per ton.

Date of approval: August 9, 1915.

To commence: September 5, 1915.

To complete: February 4, 1916.

Completed.

COMMERCIAL STATISTICS.

The following statistics for the year 1915 relative to the commerce of the harbor of refuge at Block Island, R. I., were compiled under the direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

* Allotment of \$4,500, of which \$2,108.83 was returned to Treasury.

Vessel classification.

Classes.	Total arrivals and departures.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	4,017	95,870	34,656
Sailing.....	891	14,722	895
Unregistered:			
Steamers.....	6,165	24,660	2,560
Sailing.....	145	580	.....
Total.....	11,218	135,532	38,101

Included with "Registered steamers" are 96 steamers on regular lines, 185 fishing steamers, 23 Government steamers, 32 tugs and lighters, 6 coal steamers, 3,625 large fishing motor vessels and motor yachts.

Included with "Registered sailing" are 10 large freight schooners, 248 yachts, 48 small freight schooners, 66 fishing schooners and sloops.

Included with "Unregistered steamers" are 4,460 lobster fishing power boats, 1,665 small motor fishing and pleasure party boats.

Included with "Unregistered sailing" are 145 small sloops and catboats.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	2,625 short tons.....	2,625	\$16,408.00
Lumber.....	189,400 feet b. m.	207	4,929.00
Shingles.....	163,506.....	20	653.00
Current.....	168 barrels.....	34	439.00
Bricks.....	56,500.....	112	678.00
Sand and gravel.....	21 short tons.....	21	30.50
Oil.....	116,500 gallons.....	392	17,400.00
Other building material.....	65 short tons.....	65	860.09
Salt.....	23 short tons.....	23	390.00
Rye, feed, grain.....	336 short tons.....	336	14,282.00
Live stock.....	43 head.....	18	4,320.00
Fertilizer.....	9 short tons.....	9	315.00
Merchandise ¹	653 short tons.....	553	65,300.00
Fish.....	6,812 barrels.....	1,022	102,300.00
Miscellaneous ²	339 short tons.....	339	8,991.00
Total.....	.....	5,976	236,986.50
Decrease under 1914.....	.....	1,685	.....

¹ Included with "Merchandise" are 653 tons of freight not classified, carried on regular steamer lines and freight packets.

² Included with "Miscellaneous" are 118 cords of wood, 100 tons of naval stores, 8 tons of carbide, and 15 tons of vessel wreckage.

14. GREAT SALT POND, BLOCK ISLAND, R. I.

No works of improvement or maintenance were carried on during the fiscal year.

APPROPRIATIONS.

June 3, 1896.....	\$40,000.00
Mar. 3, 1899.....	50,000.00
June 13, 1902.....	50,000.00
Mar. 3, 1905.....	30,000.00
Mar. 2, 1907.....	30,000.00
Mar. 3, 1909 (allotted Apr. 10, 1909).....	12,500.00
June 25, 1910.....	30,000.00
Total of appropriations.....	242,500.00
Returned to surplus fund of Treasury.....	4,484.37
Net total.....	238,015.63

COMMERCIAL STATISTICS.

The following statistics for the year 1915 relative to the commerce of the harbor at the Great Salt Pond, Block Island, R. I., were compiled under direction of this office from various available sources:

Season of navigation, year 1915, the entire year.

Vessel classification.

Classes.	Total arrivals and departures.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	2,509	309,234	71,879
Sailing.....	872	16,900	1,680
Barges.....	6	730	.....
Unregistered:			
Steamers.....	3,048	9,144	894
Sailing.....	76	228	.....
Total.....	7,601	336,326	74,453

Included with "Registered steamers" are 281 steamers on regular lines, 180 fishing steamers, 12 tugs and excursion steamers, 95 Government steamers, 174 steam yachts, 385 power yachts, 8 oyster steamers, 3 coal steamers, 240 submarines and tenders, and 3,356 large motor fishing vessels.

Included with "Registered sailing" are 5 large freight schooners, 42 small freight schooners, 440 sailing yachts, and 355 fishing vessels.

Included with "Registered barges" are 6 small barges and wrecking lighters.

Included with "Unregistered steamers" are 1,820 lobster-fishing power boats, and 1,228 small motor boats.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	1,091 short tons.....	1,091	\$6,518.00
Lumber.....	178,500 feet b. m.....	232	5,518.00
Shingles.....	134,000.....	17	538.00
Cement.....	164 barrels.....	33	410.00
Bricks.....	12,000.....	24	144.00
Stone.....	42 short tons.....	42	294.00
Sand and gravel.....	1,900 short tons.....	1,900	1,615.00
Oil.....	56,400 gallons.....	191	8,480.00
Other building material.....	195 short tons.....	195	1,365.00
Oysters.....	6,785 bushels.....	237	6,106.50
Salt.....	87 short tons.....	87	1,740.00
Hay, feed, grain.....	357 short tons.....	357	12,209.00
Live stock.....	413 head.....	183	53,250.00
Fertilizer.....	63 short tons.....	63	2,208.00
Manufactured iron and steel.....	38 short tons.....	38	7,687.00
Merchandise ¹	2,878 short tons.....	2,878	287,800.00
Logs and ties.....	46.....	19	276.00
Fish.....	12,296 barrels.....	1,844	184,400.00
Miscellaneous ²	249 short tons.....	249	18,820.00
Total.....	.....	9,680	600,656.50
Decrease under 1914.....	.....	480	.....

¹ Included with "Merchandise" are 2,878 tons of freight not classified, carried on regular steamer lines.

² Included with "Miscellaneous" are 145 tons of naval stores, 19 tons of vessel wreckage, 25 tons of fishing gear, and 80 tons of marble monuments and granite gravestones.

IMPROVEMENT OF RIVERS AND HARBORS IN THE NEW LONDON, CONN., DISTRICT.

REPORT OF LIEUT. COL. C. H. M'KINSTRY, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Pawcatuck River, R. I. and Conn.....	1931	9. Branford Harbor, Conn.....	1941
2. Harbor at Stonington, Conn.....	1932	10. New Haven Harbor, Conn.....	1942
3. Mystic River, Conn.....	1933	11. Breakwaters at New Haven, Conn.....	1944
4. New London Harbor, Conn.....	1934	12. Milford Harbor, Conn.....	1944
5. Thames River, Conn.....	1935	13. Housatonic River, Conn.....	1945
6. Connecticut River above Hartford, Conn.....	1937	14. Bridgeport Harbor, Conn.....	1947
7. Connecticut River below Hartford, Conn.....	1937	15. Norwalk Harbor, Conn.....	1949
8. Harbor of Refuge, Duck Island Harbor, Conn.....	1940	16. Harbors at Fivemile River, Stamford, Southport, Greenwich, and Westport Harbor and Saugatuck River, Conn.	1950

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 143 TO 194.

1. PAWCATUCK RIVER, R. I. AND CONN.

Operations were confined to the removal by Government plant of an obstructive boulder from the channel in the river at a point 400 feet below the Thread Mill wharf, at a cost of approximately \$100, and to the making of minor surveys in the vicinity of Sandy Point.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 522) - \$98,400.00

Present project:

June 3, 1896.....	\$15,000.00
Mar 3, 1899.....	15,000.00
June 13, 1902.....	9,000.00
Apr. 28, 1904 (allotted Aug. 1, 1905).....	4,100.00
Mar. 3, 1905 (near Watch Hill).....	1,000.00
Mar. 2, 1907.....	33,000.00
June 25, 1910.....	15,000.00
Mar. 4, 1913.....	6,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915).....	1,000.00
July 27, 1916.....	1,000.00
	<hr/> 100,100.00

Total of appropriations..... 198,500.00

Receipts from sales:

Steamer <i>Castle</i>	\$630.87
Condemned property.....	.10
Blue prints.....	.50
	<hr/> 631.27

Grand total..... 199,131.27

1931

COMMERCIAL STATISTICS.

[Compiled for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts and shipments.

	Short tons.
Coal	33, 169
Lumber	1, 013
Paving blocks	3, 494
General merchandise	520
Miscellaneous	877
Total	39, 073

Valuation, \$494,752.69.

Passengers, 9,800.

Of the above, 3,669 tons valued at \$118,824.89, were shipments.

The tonnage shows a decrease of 8,433 tons, or about 18 per cent from that reported for 1914.

A small steamer makes several trips a day during the summer between Stonington, Conn., and Watch Hill, R. I., by way of Little Narragansett Bay.

2. HARBOR AT STONINGTON, CONN.

Repair of breakwaters, under contract with E. S. Belden & Sons, in progress at the beginning of the fiscal year, was completed July 24, 1915. During the year 693.04 long tons of riprap stone, averaging not less than 2 tons each, were delivered and placed on the outer slope and top of the east breakwater at several points in the eastern half of its length. The expenditure was \$1,926.04. The total amount of stone delivered and placed under the contract was 5,646.50 long tons.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 559) - \$184, 453. 83

Present project:

July 14, 1880	\$25, 000. 00	
Mar. 3, 1881	30, 000. 00	
Aug. 2, 1882	25, 000. 00	
July 5, 1884	10, 000. 00	
Aug. 5, 1886	20, 000. 00	
Aug. 11, 1888	8, 000. 00	
Sept. 19, 1890	12, 500. 00	
July 13, 1892	12, 500. 00	
Aug. 18, 1894	5, 000. 00	
June 3, 1896	5, 000. 00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	6, 000. 00	
		159, 000. 00

Total of appropriations	343, 453. 83
Receipts from sale of steamer <i>Castle</i>	210. 22
Grand total	343, 664. 05

CONTRACT IN FORCE.

REPAIRS TO BREAKWATERS.

Contractor: E. S. Belden & Sons.

Date of contract: January 29, 1915.

Date of approval: February 5, 1915.

Date fixed for commencement: May 15, 1915.

Rate fixed for completion: 2,000 long tons per month.

Amount of contract: 5,646.50 long tons.

Unit price: 97 cents per long ton of stone in place.

Completed July 24, 1915.

RIVERS AND HARBORS—NEW LONDON, CONN., DISTRICT. 1933

COMMERCIAL STATISTICS.

[For calendar year 1915, furnished by keeper of Stonington Breakwater Light.]

Vessels using Stonington Harbor of Refuge.

1915	Tugs.	Schoon- ers.	Barges.	Canal boats.	Yachts.	Other craft.	Total.
January.....		12	2	1			15
February.....	2	13	5				20
March.....	1	18					19
April.....	1	18	1		4		24
May.....	1	20	9		5		35
June.....		16	3		19		38
July.....		27	10	2	18	13	70
August.....		20	11	1	46	10	88
September.....		17	5	5	30	7	64
October.....	2	23	8		6		46
November.....		20	10		2		32
December.....		13	7	1		1	22
Total.....	7	217	71	10	130	38	473

8. MYSTIC RIVER, CONN.

There were no operations during the year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 502) -	\$36,600.00
Present project:	
July 25, 1912.....	\$3,500.00
Mar. 4, 1913.....	8,160.00
	<u>11,660.00</u>
Total of appropriations.....	48,260.00
Receipts from sales:	
Steamer <i>Castle</i>	147.16
Blue prints.....	5.25
	<u>152.41</u>
Grand total.....	48,412.41

COMMERCIAL STATISTICS.

[Compiled for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts and shipments.

	Short tons.
Coal.....	25,336
Stone.....	23,483
Miscellaneous.....	849
Total.....	<u>49,668</u>

Valuation, \$144,412.17.

Of the above, 25,051 tons, valued at \$25,451.50, were shipments.

The tonnage shows a decrease of 1,315 tons compared with that reported for 1914. The decrease is due to the inactivity of the shipbuilding business at this locality.

4. NEW LONDON HARBOR, CONN.

There were no operations during the fiscal year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 505)----	\$19, 800
Present project:	
June 13, 1902-----	\$25, 000
Mar. 3, 1903-----	60, 000
Apr. 28, 1904-----	60, 000
Mar. 3, 1905-----	2, 000
June 25, 1910 (for Shaws Cove)-----	12, 000
July 27, 1916-----	170, 000
	<hr/> 329, 000
Total of appropriations-----	348. 800
Carried to surplus fund of Treasury (1909)-----	3, 600
	<hr/>
Net total-----	345, 200
Receipts from sales of blue prints-----	2
	<hr/>
Grand total-----	345, 202

COMMERCIAL STATISTICS.

[Complied for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts and shipments.

NEW LONDON HARBOR.

	Short tons.
General merchandise-----	535, 624
Coal-----	181, 950
Lumber-----	18, 354
Sand, stone, and gravel-----	23, 472
Paving blocks-----	4, 480
Miscellaneous-----	4, 120
Total-----	<hr/> 768, 000

SHAWS COVE.

Coal-----	17, 920
Lumber-----	431
Miscellaneous-----	200
Total-----	<hr/> 18, 551

Total for New London Harbor, including Shaws Cove, 786,551 tons valued at \$117,779,117.02.

Of the above 154,335 tons, valued at \$42,102,738.25, were shipments.

The tonnage for the main harbor shows a decrease of 36,998 tons, or about 5 per cent, compared with 1914. The tonnage for Shaws Cove shows a decrease of 546 tons, or about 3 per cent, compared with 1914.

Passengers, 354,901.

In addition to the above commerce, New London Harbor is used as a harbor of refuge by a large number of vessels.

There are three lines of steamboats making regular trips between this port and New York, one line furnishing nightly freight and passenger service, another nightly freight service, and the third triweekly freight and passenger service; one steamboat line, carrying freight and passengers, makes two trips per day during the summer season and triweekly trips in winter to ports at the east end of Long Island; one steamboat line, carrying freight and passengers, makes several trips per day to Fishers Island; a steamboat, carrying

RIVERS AND HARBORS—NEW LONDON, CONN., DISTRICT. 1935

freight and passengers, makes daily trips during the summer to Block Island and Norwich; steamers of the Quartermaster Department, United States Army, carrying supplies and passengers, make daily trips to the near-by island fortifications; and several small vessels are engaged during the summer in carrying passengers to near-by river and shore resorts.

[Furnished by deputy collector of customs at New London, Conn.]

Value of imports	\$55,182.00
Duty on imports	5.60
<hr/>	
Foreign vessels:	
Entered	10
Cleared	8
American vessels entered from foreign ports	6

5. THAMES RIVER, CONN.

The repair of Trading Cove Dike, by Government plant and hired plant and labor, which had been commenced during the preceding year, was resumed August 25, 1915, and continued during such times as the Government plant was available until December 9, 1915. A total of 1,901 linear feet of dike was restored to project dimensions by the use of 2,101 long tons of riprap stone, ranging from about 25 pounds to 1 ton in size. Of this amount, 1,611.7 tons were reclaimed by dredging from old jetties K and M, adjoining Long Rock Dike, and 489.3 tons were purchased in open market. The cost of the work per ton of stone in place, including inspection and administration, was \$1.66.

Dredging under contract with the Maritime Dredging Co., for the restoration of the 20-foot channel to Allyns Point, in progress at the beginning of the fiscal year, was completed August 18, 1915. Portions of the channel at Bartletts Crossover and the channel between Gales Ferry and Allyns Point were restored to project depth by the removal of 9,354.6 cubic yards of mud from the former locality and 8,953.3 cubic yards from the latter. The material was disposed of by dumping upon the public dumping ground in Long Island Sound, 3¼ miles due south of New London Light. The amount expended on account of this work during the year was \$9,805.13. At the completion of the dredging a careful instrumental examination of the channels was made.

A survey of an obstructive ledge in Long Reach Channel between Allyns Point and Stoddards Wharf was made.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 566) - \$40,800.00

Present project:

June 23, 1866	\$10,000.00
Mar. 2, 1867	72,000.00
Mar. 3, 1871	15,000.00
June 10, 1872	10,000.00
June 18, 1878	10,000.00
Mar. 3, 1879	12,000.00
June 14, 1880	22,500.00
Mar. 3, 1881	80,000.00
Aug. 2, 1882	35,000.00
July 5, 1884	25,000.00

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Present project—Continued.

Aug. 6, 1888	\$22,500.00
Aug. 11, 1888	50,000.00
Sept. 19, 1890	20,000.00
July 13, 1892	30,000.00
Aug. 18, 1894	12,500.00
June 8, 1896	12,000.00
Mar. 8, 1899	20,000.00
June 13, 1902	15,000.00
Mar. 8, 1905	84,100.00
Mar. 2, 1907	30,000.00
June 25, 1910	11,500.00
Mar. 4, 1913	12,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	5,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	14,500.00
July 27, 1916	9,000.00
	\$539,600.00

Total of appropriations 579,900.00

Receipts from sales, etc.:

Sept. 20, 1909 (recovered from defaulting contractor)	200.00
Steamer <i>Castle</i>	504.54
Blue prints	4.50
Condemned property	152.00
	861.04

Grand total 580,761.04

CONTRACT IN FORCE.

MAINTENANCE DREDGING BELOW ALLYNS POINT.

Contractor: Maritime Dredging Co.
 Date of contract: February 12, 1915.
 Date of approval: March 8, 1915.
 Date fixed for commencement: July 6, 1915.
 Date fixed for completion: September 7, 1915.
 Amount of contract: 42,041 cubic yards.
 Unit price: 24.8 cents per cubic yard, scow measurement.
 Completed August 18, 1915.

COMMERCIAL STATISTICS.

[Compiled for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts and shipments.

	Short tons
Coal	812,277
Paper stock, pulp, etc	80,929
General merchandise	17,736
Lumber	15,195
Petroleum products	12,452
Miscellaneous	572
Total	889,161

Valuation, \$9,646,479.75.

Of the above, 19,154 tons, valued at \$2,655,330, were shipments.

The tonnage shows a decrease of 101,444 tons, or about 21 per cent, from that reported for 1914, mainly in the item of stone, important quarries being closed during the year.

Passengers, 29,200.

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One steamboat line, carrying freight and passengers, operates triweekly service between Norwich and New York, stopping en route at river landings and New London, and one steamboat, carrying freight and passengers, makes daily trips during the summer between Norwich and Block Island.

6. CONNECTICUT RIVER ABOVE HARTFORD, CONN.

Operations were limited to examinations and surveys relative to future improvement.

APPROPRIATIONS.

July 11, 1870		\$20,000.00
Mar. 8, 1871		20,000.00
June 10, 1872		25,000.00
Mar. 8, 1873		20,000.00
June 14, 1880		15,000.00
June 13, 1902 (survey)		25,000.00
Mar. 2, 1907		5,000.00
July 25, 1912		25,000.00
Total of appropriations		155,000.00
Carried to surplus fund of Treasury	\$12,675.19	
Transferred under river and harbor act of Mar. 4, 1915	10,000.00	
		22,675.19
Net total		181,824.81
Receipts from sale of blue prints		8.50
Grand total		181,823.81

7. CONNECTICUT RIVER BELOW HARTFORD, CONN.

At the beginning of the fiscal year dredging under contract with the Hartford & New York Transportation Co. was in progress for the maintenance of the channels through the river bars. The following work was done from July 1 to September 8, 1915:

	Width of dredging.	Cubic yards.
	<i>Fath.</i>	
City Banks Bar	7½	1,187
Pilot Point Bar	7½	4,226
Olderleeve Shoal (in progress at beginning of fiscal year)	100-125	2,880
Turn above Eddy Rock	100-125	7,811
Saw Shoal	100	9,488
Ream Shoal	100	4,088
Total		26,712

Under the same contract 36,619 cubic yards were removed prior to July 1, 1915, making a total of 73,332 cubic yards.

Contract was again entered into on March 22, 1916, with the Hartford & New York Transportation Co. for the necessary dredging at the various river bars during the season of 1916. Work under the contract was begun May 16, 1916; was suspended May 18 to 23,

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inclusive, on account of freshet; and was in progress at the end of the fiscal year. The following work was accomplished:

	Width of dredging.	Cubic yards.
Hartford lower bar (in progress at close of fiscal year).....	Feet. 50	1,154
Dividend Bar.....	75	10,082
Pistol Point Bar.....	75-100	5,577
Gildersleeve Shoal.....	100	4,988
Total.....	.....	22,801

The expenditure for dredging during the fiscal year was \$8,879.66, all for maintenance.

Work under contract with Olsen & Klavens for bank revetment at Wethersfield (Cys Hollow), in progress at the beginning of the fiscal year, was completed December 3, 1915. During the fiscal year 15,879.7 cubic yards of grading was done, 7,332.87 tons of riprap placed; 3,416 linear feet of bank was graded and 3,653 linear feet revetted, for which the expenditure during the fiscal year was \$21,211.51, for new work. Under the entire contract 4,178 linear feet of bank about 12 to 16 feet high above mean low water, was graded to a slope of 1 on $1\frac{1}{2}$ and revetted; the total grading amounted to 21,880.7 cubic yards, and 7,660.08 long tons of riprap was used in the revetment.

The southerly portion of the bank, below mean low water, was protected by a mattress 32 feet wide and 2,085 feet long, of brush fascines held in place by 480 tons of riprap. The mattress was constructed and some of the brush was cut by hired labor, the stone and most of the brush being purchased in open market. This work was begun September 2, 1915, and completed September 24 at a total cost of \$3,657.41, including brush and stone.

The entire cost of the revetment of this reach, 4,178 feet long, including the mattress, was \$26,767.90, or \$6.40 per linear foot.

Minor repairs as follows were made with the U. S. lighter *Panuco* and hired labor, and stone purchased in open market:

	Riprap.	Total cost.
	Long tons.	
West Jetty at Saybrook, inshore end	245.24	\$1,194.28
Revetment at site of old Slam Dock.....	189.23	896.70
Stone spurs at Press Barn Bar, inshore ends.....	170.11	282.51
Total.....	704.58	1,763.49

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 434) - \$685, 510. 69
Present project:

Feb. 27, 1911.....	\$77, 000. 00	
Aug. 24, 1912.....	40, 000. 00	
Mar. 4, 1913.....	15, 000. 00	
June 23, 1913.....	60, 000. 00	
Mar. 4, 1915 (allotted Apr. 1, 1915).....	30, 000. 00	
July 27, 1916.....	15, 000. 00	
		237, 000. 00
Total of appropriations.....		922, 510. 69

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Receipts from sales:

Steamer <i>Castle</i>	\$840.90	
Condemned property.....	110.99	
Blue prints.....	15.75	
		\$967.64
Grand total		928,478.83

CONTRACTS IN FORCE.

MAINTENANCE DREDGING.

Contractor: Hartford & New York Transportation Co.
 Date of contract: March 25, 1915.
 Date of approval: April 13, 1915.
 Date fixed for commencement: May 10, 1915.
 Rate fixed for completion: 20,000 cubic yards per month.
 Amount of contract: 72,832 cubic yards.
 Unit price: 13 cents per cubic yard, scow measurement.
 Completed September 8, 1915.

Contractor: Hartford & New York Transportation Co.
 Date of contract: March 22, 1916.
 Date of approval: April 14, 1916.
 Date fixed for commencement: May 16, 1916.
 Rate fixed for completion: 20,000 cubic yards per month.
 Amount of contract: 100,000 cubic yards (estimated).
 Unit price: 14 cents per cubic yard, scow measurement.
 Completed at end of fiscal year: 22½ per cent.

BANK REVETMENT AT WETHERSFIELD, CONN.

Contractor: Olsen & Klavens.
 Date of contract: April 9, 1915.
 Date of approval: April 20, 1915.
 Date fixed for commencement: June 28, 1915.
 Date fixed for completion: October 28, 1915. (Waived.)
 Amount of contract: Grading, 21,880.7 cubic yards; revetment, 8,140.68 long tons.
 Unit prices: Grading, 45 cents per cubic yard; revetment, \$1.28 per long ton of riprap in place.
 Completed December 8, 1915.

COMMERCIAL STATISTICS.

[Compiled for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts and shipments.

	Short tons.		Short tons.
Coal.....	460,645	Cement, plaster, etc.....	2,900
General merchandise.....	105,365	Petroleum products.....	5,159
Stone.....	23,476	Building material.....	1,629
Fertilizers.....	20,129	Miscellaneous.....	4,460
Feldspar.....	8,568		
Lumber.....	9,195	Total	641,562

Valuation, \$39,835,837.24.

Number of passengers carried, 64,515.

Of the above, 67,811 tons were shipments.

The tonnage shows an increase of 81,834 tons, or about 14.5 per cent, compared with that reported for 1914, the increase being mainly in the items of coal and general merchandise.

Included in the above are 711 tons, valued at \$14,369.00, received and shipped in Eightmile River.

During the calendar year nine barges, valued at \$57,000, were built at the yards of the Glidersleeve Ship Building Co., near Portland, Conn.

A regular line of freight and passenger steamers, two boats, makes daily trips, except when the river is closed by ice, between New York and Hartford, with intermediate stops at various landings between Hartford and the mouth of the river; and one small freight boat made daily trips during the summer months between Saybrook Point and Long Island.

8. HARBOR OF REFUGE, DUCK ISLAND HARBOR, CONN.

Work under emergency contract with estate of John Beattie was in progress from August 19 to October 18, 1915. The southerly side of the breakwater westerly from Duck Island was repaired throughout its length, a small amount of stone was placed on the northerly side of the same breakwater, and the outer end of the Kelsey Point Breakwater was repaired. The amount of stone used was 2,347.11 long tons on the breakwater westerly from Duck Island and 411.70 long tons on the Kelsey Point Breakwater, a total of 2,758.81 long tons.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 68d Cong., 3d sess., p. 444) - \$120, 202. 00
Present project:

June 25, 1910.....	\$80, 000. 00	
Feb. 27, 1911.....	100, 000. 00	
Aug. 24, 1912.....	50, 000. 00	
June 23, 1913.....	82, 000. 00	
Aug. 1, 1914.....	7, 000. 00	
July 27, 1916.....	71, 000. 00	
		370, 000. 00
Total of appropriations.....		490, 202. 00
Receipts from sales:		
Steamer <i>Castle</i>	\$1, 009. 08	
Condemned property.....	218. 83	
Blue prints.....	4. 50	
		1, 227. 41
Grand total.....		491, 429. 41

CONTRACT IN FORCE.

REPAIR OF BREAKWATERS.

Contractor: Estate of John Beattie.

Date of contract: August 18, 1915.

Date of approval: (Emergency).

Date fixed for commencement: September 18, 1915.

Date fixed for completion: October 13, 1915.

Amount of contract: 2,758.81 long tons of riprap.

Unit price: \$1.02 per long ton in place.

Completed October 18, 1915.

RIVERS AND HARBORS—NEW LONDON, CONN., DISTRICT. 1941

COMMERCIAL STATISTICS.

[For calendar year 1915 furnished by keeper of Duck Island Light.]

Vessels using Duck Island Harbor of Refuge.

1915	Tugs.	Schoon- ers.	Barges.	Canal boats.	Yachts.	Other vessels.	Total.
January.....	3	3	7	1	.....	3	17
February.....	3	5	9	.....	.....	.....	17
March.....	3	15	12	4	.....	.....	34
April.....	7	17	9	4	.....	1	38
May.....	4	15	11	3	6	1	40
June.....	1	18	.....	4	26	3	53
July.....	2	45	4	7	110	3	171
August.....	4	26	18	3	73	1	125
September.....	3	19	7	5	81	2	67
October.....	3	17	15	1	10	5	51
November.....	4	25	8	5	.....	4	46
December.....	4	12	10	8	.....	1	35
Total.....	41	217	110	45	256	24	683

The above report shows that 282 fewer vessels used this harbor during the past calendar year than were reported as so doing in 1914. The decrease is largely among tugs and barges, of which less than half as many used the harbor during 1915 as were reported as so doing in 1914. This is believed to be due in a large measure to the shoaling which has reached such a point that many vessels that formerly used the harbor are now unable to do so.

9. BRANFORD HARBOR, CONN.

There were no operations during the fiscal year.

APPROPRIATIONS.

June 13, 1902.....	\$5,000.00
Mar. 3, 1905.....	3,000.00
Mar. 2, 1907.....	5,000.00
June 25, 1910.....	2,000.00
July 25, 1912.....	3,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915).....	4,000.00
Total of appropriations.....	22,000.00
Receipts from sale of blue prints.....	3.50
Grand total.....	22,003.50

COMMERCIAL STATISTICS.

[Compiled for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts.

	Short tons.
Coal.....	18,174
Sand, gravel, and clay.....	9,099
Iron.....	3,911
Miscellaneous.....	1,013
Total.....	32,227

Valuation, \$145,503.

No shipments were reported for 1915.

The tonnage shows a decrease of 9,106 tons, or about 22 per cent, from that reported for 1914, mainly in the items of iron, sand, gravel, and clay.

10. NEW HAVEN HARBOR, CONN.

The enlargement of the main channel was completed by contract. This involved dredging to depth of 20 feet an area about 6,600 feet long and from 100 to 280 feet wide, and also redredging the adjacent portions of the existing channel where shoal. A total of 806,118 cubic yards of material was removed, from which was deducted 23,168 cubic yards for overdepth dredging. Of the total amount 91,505 cubic yards was chargeable to maintenance, having been removed from the existing channel; the remainder, 691,445 cubic yards, was new work. The work was begun July 26, 1915, and completed October 26, 1915.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 505)	\$328, 000. 00
Present project:	
Mar. 3, 1899	\$50, 000. 00
June 6, 1900	50, 000. 00
Mar. 3, 1901	50, 000. 00
June 13, 1902	67, 000. 00
Mar. 8, 1903	63, 073. 90
Apr. 23, 1904 (allotted Aug. 1, 1904)	9, 000. 00
Mar. 3, 1905	9, 000. 00
Mar. 3, 1905 (West River)	38, 500. 00
Mar. 2, 1907	10, 000. 00
Mar. 2, 1907 (allotted Nov. 30, 1908)	3, 000. 00
Mar. 3, 1909 (allotted Apr. 23, 1909)	20, 000. 00
June 25, 1910	68, 000. 00
July 25, 1912 (West River)	54, 000. 00
July 25, 1912 (Mill and Quinnipiac Rivers)	19, 200. 00
Mar. 4, 1913	90, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)	88, 000. 00
	636, 773. 90
Total of appropriations	1, 012, 773. 90
Withdrawn, Dec. 21, 1910	1, 832. 98
Net total	1, 010, 940. 92
Receipts from sales:	
Steamer <i>Castle</i>	\$420. 45
Blue prints	100. 14
Condemned property .....	. 30
	520. 89
Grand total	1, 011, 461. 81

CONTRACT IN FORCE.

DREDGING—WIDENING MAIN CHANNEL.

Contractor: Morris & Cumings Dredging Co.

Date of contract: January 12, 1915.

Date of approval: January 22, 1915.

Date fixed for commencement: April 26, 1915. (Waived.)

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Rate fixed for completion: First month, 80,000 cubic yards, and thereafter 50,000 cubic yards per month.

Amount of contract: 782,950 cubic yards.

Unit price: 7.44 cents per cubic yard, scow measurement.

Completed October 28, 1915.

COMMERCIAL STATISTICS.

[Compiled for calendar year from reports furnished by shippers and receivers.]

Receipts and shipments.

[In short tons.]

	Main harbor.	Quinnipiac River.		Mill River.			West River.	Total.
		Below Ferry Street.	Above Ferry Street.	Below Chapel Street.	East Branch.	West Branch.		
General merchandise.....	231,976						247	232,223
Coal.....	661,233	14,185	59,591		113,932	271,222	85,949	1,180,363
Lumber.....	49,541			5,456		276	6,909	62,182
Oysters.....	2,110	9,824	20,521				9,091	41,546
Oyster shells.....	24	2,946	23,553				13,437	29,960
Sand, stone, etc.....	27,055		8,196			1,723	7,295	39,312
Iron and steel.....	12,026				1,214			13,240
Paving blocks.....	6,081							6,081
Chemicals.....	2,455	10,505						12,961
Fertilizers.....	1,102						9,020	10,122
Building materials.....	159		642			1,127	321	2,249
Cement.....			3,346			5,400	5,138	13,894
Gypsum.....			5,712					5,712
Furroleum and products.....		6,567				12,039		18,606
Miscellaneous.....	4,774		153			2,844	96	7,866
Total.....	1,129,090	43,977	116,953	5,456	115,146	294,631	87,603	1,792,856

SUMMARY.

	Short tons.	Value.
Main harbor.....	1,129,090	\$95,377,119.47
Quinnipiac River:		
Below Ferry Street.....	43,977	555,730.90
Above Ferry Street.....	116,953	633,187.42
Mill River:		
Below Chapel Street.....	5,456	60,080.00
East Branch.....	115,146	524,406.90
West Branch.....	294,631	1,246,632.55
West River.....	87,603	1,161,690.16
Total.....	1,792,856	\$9,561,097.40

Of the above amount, 198,312 tons, largely general merchandise, were shipments.

Passengers carried, 116,665.

The tonnage for the entire harbor shows an increase of 88,002 tons, or about 5 per cent, above that reported for 1914. Traffic shows an increase in the main harbor and Mill River and a decrease in the Quinnipiac and West Rivers.

A regular line of steamers carrying freight and passengers makes daily trips to New York; another line, carrying freight only, makes daily trips to New York; a third line, carrying freight and passengers and running between New Haven (West River) and Port Jefferson, N. Y., makes daily trips throughout the summer months.

[Furnished by deputy collector of customs at New Haven, Conn.]

Value of imports.....	\$330,342.00
Duty on imports.....	68,133.60

1944 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1910.

Foreign vessels:

Entered	5
Cleared	6
American vessels entered from foreign ports	16

11. BREAKWATERS AT NEW HAVEN, CONN.

There were no operations during the fiscal year.

APPROPRIATIONS.

Mar. 8, 1879	\$30,000.00
June 14, 1880	80,000.00
Mar. 8, 1881	60,000.00
Aug. 2, 1882	60,000.00
July 5, 1884	40,000.00
Aug. 5, 1886	75,000.00
Aug. 11, 1888	75,000.00
Sept. 19, 1890	120,000.00
July 18, 1892	120,000.00
Aug. 18, 1894	125,000.00
June 8, 1896	100,000.00
June 18, 1902	44,000.00
Mar. 2, 1907	100,000.00
May 27, 1908	150,000.00
June 25, 1910	100,000.00
Feb. 27, 1911	85,000.00

Total of appropriations	1,264,000.00
Receipts from sales:	
Steamer <i>Castle</i>	\$3,243.46
Condemned property .....	.85
	8,244.31
Grand total	1,267,244.31

COMMERCIAL STATISTICS.

No satisfactory record of the number of vessels using this harbor of refuge was obtained for the calendar year 1915. During the calendar year 1910, 6,112 vessels were reported by the keeper of Southwest Ledge Light as having sought refuge behind the different breakwaters.

12. MILFORD HARBOR, CONN.

There were no operations during the fiscal year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 496)	\$45,500
Present project:	
June 13, 1902	\$15,000
Mar. 8, 1905	10,000
June 25, 1910	2,000
Mar. 4, 1913	5,000
	82,000
Total of appropriations	77,500

RIVERS AND HARBORS—NEW LONDON, CONN., DISTRICT. 1945

COMMERCIAL STATISTICS.

[Compiled for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts and shipments.

	Short tons.
Oysters and shells.....	5,740
Crushed stone.....	2,980
Coal.....	1,750
Lumber.....	688
Manure.....	2,178
Total.....	13,312

Valuation, \$68,325.94.

Of the above amount, 2,850 short tons, valued at \$18,740, were shipments.

The tonnage shows a decrease of 5,152 tons, or about 29 per cent, from that reported for 1914, the decrease being in the item of oysters and shells.

In addition to the freight-laden vessels using this harbor a large number of pleasure craft, some of considerable size, frequent it, and it is considerably used as a harbor of refuge by oyster craft.

13. HOUSATONIC RIVER, CONN.

Under open-market agreement with the T. A. Scott Co. (Inc.) maintenance dredging was begun July 20 and completed August 3, 1915. The channels opposite the Stratford Dike and at Mill Bar were restored to project dimensions. The first-named channel was dredged for a length of about 150 feet and width of 100 feet, 1,539 cubic yards of material being removed; and the Mill Bar Channel was dredged for a length of about 300 feet and width of from 40 to 80 feet, 861 cubic yards of material being removed. The unit price paid was 45 cents per cubic yard, scow measurement, and the expenditure on account of this work was \$1,214.88.

Repairs to the outer breakwater, under contract with the estate of John Beattie, were begun October 4 and completed October 8, 1915. A total of 419.93 long tons of riprap stone was delivered and placed on the outer end of this breakwater, which had suffered from wave attack. At the close of the work the breakwater was in good repair throughout its length. The expenditure on account of this work was \$581.57.

After the subsidence of the freshets in the spring of 1916, an instrumental examination was made, which showed that considerable shoaling had taken place at a number of bars, particularly at Mill Bar, where the controlling depth was only about 5 feet. Under date of May 29 proposals were invited, to be opened June 8, for the restoration of the Mill Bar Channel to project dimensions, but no bids were received, and up to the end of the fiscal year it had been impracticable to restore this channel to project dimensions.

APPROPRIATIONS.

Mar. 3, 1871.....	\$15,000.00
June 10, 1872.....	15,000.00
Mar. 3, 1873.....	10,000.00
June 23, 1874.....	10,000.00
Mar. 3, 1875.....	5,000.00
June 18, 1878.....	5,000.00
June 14, 1880.....	2,000.00

1946 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Mar. 8, 1881	\$2,000.00
Aug. 2, 1882	2,000.00
July 5, 1884	2,500.00
Aug. 5, 1886	5,000.00
Aug. 11, 1888	85,000.00
Sept. 19, 1890	85,000.00
July 13, 1892	20,000.00
Aug. 18, 1894	25,000.00
June 3, 1896	25,000.00
Mar. 3, 1899	15,000.00
June 13, 1902	10,000.00
Apr. 23, 1904 (allotted Aug. 1, 1904)	3,950.00
Mar. 3, 1905	10,000.00
Mar. 2, 1907	20,000.00
Mar. 3, 1909 (allotted Apr. 23, 1909)	5,000.00
June 25, 1910	20,000.00
July 25, 1912	10,000.00
Mar. 4, 1913	20,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	1,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	6,000.00
July 27, 1916	12,000.00
Total of appropriations	348,450.00
Receipts from sales:	
Steamer <i>Castle</i>	\$1,051.12
Condemned property	91.14
	1,142.26
Grand total	347,502.26

CONTRACT IN FORCE.

REPAIRS TO OUTER ARM OF BREAKWATER.

Contractor: Estate of John Beattie.
Date of contract: August 13, 1915.
Date of approval: (Emergency).
Date fixed for commencement: September 13, 1915.
Date fixed for completion: October 13, 1915.
Amount of contract: 419.98 long tons of riprap.
Unit price: \$1.21 per long ton in place.
Completed, October 8, 1915.

COMMERCIAL STATISTICS.

[Compiled for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts and shipments.

At Derby and Shelton, Conn.:	Short tons.
Coal	83,929
Sand	2,912
Miscellaneous	50
Total (valuation, \$433,114)	86,891
At Stratford, Conn., and vicinity:	
Petroleum products	21,967
Coal	16,774
Oyster shells	15,000
Building material	951
Total (valuation, \$1,116,224.10)	54,692

RIVERS AND HARBORS—NEW LONDON, CONN., DISTRICT. 1947

Total tonnage for Housatonic River, 141,583.

Total valuation for Housatonic River, \$1,549,838.10.

Of the above amount, 15,050 short tons were shipments.

The tonnage for the entire river is the largest reported since 1902, when the present method of collecting these statistics by signed reports from the shippers and receivers of freight was adopted. It shows an increase of 26,595 tons, or about 23 per cent, over that reported for 1914, the next largest report, the increase being mainly in coal.

14. BRIDGEPORT HARBOR, CONN.

Contract was entered into for the restoration to project dimensions of the Yellow Mill Channel. Work had not been begun at the close of the fiscal year.

A proposed system of harbor lines in Cedar Creek was laid down on the ground. Inspection was made of work done under permits, including the reconstruction of the Stratford Avenue Bridge across the Poquonock River, which was in progress at the close of the fiscal year.

APPROPRIATIONS.

Total appropriations for Black Rock Harbor, Conn., to Aug. 18, 1904 (see H. Doc. No. 1491, 63d Con., 8d sess., p. 414)	\$72,550.00
Previous projects, Bridgeport Harbor (see H. Doc. No. 1491, 63d Cong., 8d sess., p. 413)	\$18,000.00
Present project:	
Mar. 3, 1899	\$50,000.00
June 6, 1900	50,000.00
Mar. 3, 1901	50,000.00
Mar. 3, 1905	10,000.00
June 30, 1906	72,500.00
Mar. 2, 1907	113,000.00
Mar. 2, 1907 (allotted Jan. 1, 1906)	*9,781.96
May 27, 1908	40,000.00
Mar. 3, 1909 (allotted Apr. 23, 1909)	*10,000.00
Mar. 4, 1909	100,000.00
June 25, 1910 (river and harbor act)	100,000.00
June 25, 1910 (sundry civil act)	25,000.00
	630,281.96
Total of appropriations	1,020,831.96
Amount withdrawn (1910)	10,000.00
Transferred under river and harbor act of Mar. 4, 1915	50,000.00
	60,000.00
Net total	960,831.96
Receipts from sales and collections:	
June 10, 1911, collected from American Surety Co. on account of defaulting contractor	25,000.00
Steamer Castle	1,177.28
Blue prints	12.50
	26,189.76
Grand total	987,021.72

*Includes \$2,500 allotted from appropriation of July 13, 1892, for examinations, surveys, and contingencies, for repair of sea wall.

*Allotment of \$10,000, of which \$212.04 was returned to Treasury.

*Withdrawn.

1948 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

CONTRACT IN FORCE.

MAINTENANCE DREDGING—YELLOW MILL CHANNEL.

Contractor: Maritime Dredging Co.
 Date of contract: May 24, 1916.
 Date of approval: June 20, 1916.
 Date fixed for commencement: July 14, 1916.
 Rate fixed for completion: 20,000 cubic yards per month.
 Amount of contract, including allowable overdepth; 55,000 cubic yards (estimated).
 Unit price: 14½ cents per cubic yard, scow measurement.
 Completed at end of fiscal year: None.

COMMERCIAL STATISTICS.

[Compiled for calendar year 1915 from reports furnished by shippers and receivers.]

Receipts and shipments.

[In short tons.]

	Main Harbor.	Poquonock River.	Yellow Mill.	Johnsons River.	Cedar Creek.	Burr Creek.	Total.
General merchandise.....	128,712						128,712
Coal.....	56,128	207,188	167,137	7,940	115,730	2,500	550,543
Sand, stone, clay, etc.....	24,983	13,887	22,215		21,768	4,767	97,663
Iron and steel.....	311	1,612	38,809		37,867		78,599
Petroleum and products.....				1,044	54,666		55,710
Lumber.....		32,476			7,708		40,184
Oysters.....	25,456						25,456
Building materials.....		13,966			4,000		17,966
Chemicals.....					14,066		14,066
Oyster shells.....	14,056						14,056
Miscellaneous.....	603	2,255	902	57	2,891		6,708
Total.....	310,260	371,394	169,066	8,941	208,705	7,267	1,135,633

SUMMARY.

	Short tons.	Value.
Main harbor.....	310,260	\$65,676,000.39
Poquonock River.....	371,394	2,072,382.17
Yellow Mill.....	169,066	1,645,808.06
Johnsons River.....	8,941	78,795.00
Cedar Creek.....	208,705	2,160,540.57
Burr Creek.....	7,267	18,337.51
Total.....	1,135,633	71,061,781.90

Of the above amount 123,078 short tons were shipments.

Total number of passengers carried, 121,270.

The tonnage for the entire harbor shows an increase of 96,225 tons, or about 9 per cent above that reported for 1914.

Two regular lines of steamers make daily trips to New York, one line carrying freight and passengers and the other carrying freight only. Another line makes daily trips to Port Jefferson, N. Y., throughout most of the year.

[Furnished by collector of customs, Bridgeport, Conn.]

Value of imports.....\$573,810.00
 Duty on imports.....178,577.77

Foreign vessels:

Entered.....
 Cleared.....

11
5

RIVERS AND HARBOURS—NEW LONDON, CONN., DISTRICT. 1949

American vessels from foreign ports:

Entered.....	20
Cleared.....	11

15. NORWALK HARBOR, CONN.

Work under open-market agreement with the Maritime Dredging Co. for the restoration of the basin at Norwalk to project dimensions, which was begun June 30, was completed July 12, 1915. During the fiscal year 2,956 cubic yards of ordinary material, mainly mud, and 27.6 cubic yards of bowlders over one-half cubic yard each in size was removed, making a total of 3,470 cubic yards of ordinary material and the above-named bowlders removed under the agreement. The unit prices for the work were 23½ cents per cubic yard for ordinary material and \$10 per cubic yard for bowlders over one-half cubic yard each, and the expenditure on account of this work was \$1,169.88. The basin was restored to full project capacity.

An instrumental examination made during May, 1916, showed depths rather more than expected, but with much reduced widths in the various channels.

The total expenditure during the fiscal year, including administration, inspections, etc., was \$1,817.96, applied to maintenance.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 2d sess., p. 510) — \$134, 913. 00

Present project:

Mar. 2, 1907.....	\$63, 500. 00	
June 25, 1910.....	4, 000. 00	
July 27, 1916.....	5, 000. 00	
		72, 500. 00

Total of appropriations.....	207, 413. 00
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Receipts from sales:

Steamer <i>Castle</i>	\$1, 009. 08	
Blue prints.....	4. 00	
		1, 013. 08

Grand total.....	208, 426. 08
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COMMERCIAL STATISTICS.

[Compiled for calendar year 1918 from reports furnished by shippers and receivers.]

Receipts and shipments.

[In short tons.]

	South Norwalk.	East Norwalk.	Norwalk.	Total.
General merchandise.....	50, 437	.....	23, 734	74, 171
Coal.....	49, 151	1, 473	23, 471	74, 095
Oysters and shells.....	45, 984	.....	.....	45, 984
Paper stock and pulp.....	.....	.....	16, 680	16, 680
Lumber.....	.....	.....	2, 422	2, 422
Sand and stone.....	8, 990	.....	6, 008	15, 998
Miscellaneous.....	2, 858	.....	661	3, 519
Total.....	157, 420	1, 473	73, 496	237, 391

Valuation.

South Norwalk	\$22,488,000.84
East Norwalk	7,500.00
Norwalk	10,728,596.74
Total	33,174,097.08

Of the above amount 48,695 tons were shipments.

The tonnage for the entire harbor shows an increase of 30,924 tons, or about 15 per cent above that reported for 1914, mainly in the item of general merchandise, practically all other items showing a decrease.

A line of freight steamers makes daily trips between Norwalk, South Norwalk, and New York throughout the greater portion of the year. All Norwalk freight passes through the main channel past South Norwalk. South Norwalk freight includes only that received or shipped at South Norwalk.

[Furnished by collector of customs, Bridgeport, Conn.]

Value of imports	\$140,122.00
Duty on imports	10,990.59
American vessels from foreign ports:	
Entered	24
Cleared	2

16. HARBORS AT FIVEMILE RIVER, STAMFORD, SOUTHPORT, GREENWICH, AND WESTPORT HARBOR, AND SAUGATUCK RIVER, CONN.

(A) FIVEMILE RIVER HARBOR, CONN.

There were no operations during the fiscal year.

(B) STAMFORD HARBOR, CONN.

There were no operations during the fiscal year other than an instrumental examination with regard to the existing condition of the improvement.

(C) SOUTHPORT HARBOR, CONN.

There were no operations during the fiscal year.

(D) GREENWICH HARBOR, CONN.

There were no operations during the fiscal year other than an instrumental examination with regard to the existing condition of the improvement.

(E) WESTPORT HARBOR AND SAUGATUCK RIVER, CONN.

There were no operations during the fiscal year.

APPROPRIATIONS.

FIVEMILE RIVER HARBOR.

Aug. 11, 1888	\$5,000.00
Sept. 19, 1890	5,000.00
July 18, 1892	5,000.00
Aug. 18, 1894	2,500.00
June 8, 1896	2,500.00
Mar. 8, 1899	2,500.00

RIVERS AND HARBORS—NEW LONDON, CONN., DISTRICT. 1951

June 13, 1902 (allotted Nov. 8, 1902)	\$4,500.00
Mar. 3, 1905 (allotted June 17, 1905)	6,000.00
Mar. 2, 1907 (allotted Apr. 1, 1907)	7,000.00
June 25, 1910 (allotted June 28, 1910)	5,000.00
Feb. 27, 1911 (allotted Apr. 27, 1911)	2,000.00
Mar. 4, 1913 (allotted June 3, 1913)	2,850.00

Total of appropriations	49,350.00
Transferred to Stamford Harbor	209.56
Net total	49,140.44
Receipts from sale of steamer <i>Castle</i>	105.11
Grand total	49,245.55

STAMFORD HARBOR, CONN.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 558) - \$20,100.00

Present project:

July 13, 1892	\$15,000.00
Aug. 18, 1894	10,000.00
June 3, 1896	10,000.00
Mar. 3, 1899	6,000.00
June 13, 1902 (allotted Nov. 8, 1902)	10,111.00
Mar. 3, 1905 (allotted June 17, 1905)	18,000.00
Mar. 2, 1907 (allotted Apr. 1, 1907)	58,000.00
June 25, 1910 (allotted July 28, 1910)	32,000.00
Transferred from Fivemile River Harbor (1906)	209.56
Transferred from Greenwich Harbor (1908)	939.97
	160,260.53

Total of appropriations	180,360.53
Receipts from sale of steamer <i>Castle</i>	420.45
Grand total	180,780.98

SOUTHPORT HARBOR, CONN.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 557) - \$31,087.48

Present project:

June 13, 1902 (allotted Nov. 8, 1902)	\$8,889.00
Mar. 3, 1905 (allotted June 17, 1905)	9,000.00
Mar. 2, 1907 (allotted Apr. 1, 1907)	2,000.00
June 25, 1910 (allotted July 28, 1910)	500.00
July 25, 1912	15,000.00
Transferred from Greenwich Harbor (1908)	459.51
	85,848.51

Total of appropriations	66,935.94
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GREENWICH HARBOR, CONN.

June 3, 1896	\$6,000.00
June 13, 1902 (allotted Nov. 8, 1902)	6,667.00
Apr. 24, 1904 (allotted Aug. 1, 1904)	2,100.00
Mar. 3, 1905 (allotted June 17, 1905)	7,000.00
Mar. 2, 1907 (allotted Apr. 1, 1907)	1,000.00
June 25, 1910 (allotted July 28, 1910)	2,000.00
Feb. 27, 1911 (allotted Apr. 27, 1911)	1,500.00
Mar. 4, 1913 (allotted June 3, 1913)	2,400.00

Total of appropriations	28,667.00
Transferred to Stamford Harbor (1908)	\$939.97
Transferred to Southport Harbor (1908)	459.51
Transferred to Westport Harbor and Saugatuck River (1906)	270.99
	1,670.47

Net total	26,996.53
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1952 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Receipts from sales:

Steamer <i>Castle</i>	\$240. 26	
Blue prints.....	7. 00	
		<u>\$247. 26</u>
Grand total.....		27, 243. 79

WESTPORT HARBOR AND SAUGATUCK RIVER, CONN.

Previous projects (see H. Doc. No. 1491, 63d Cong, 3d sess., p. 576)..... \$19, 444. 00

Present project:

July 13, 1892.....	\$7, 000. 00	
Aug. 18, 1894.....	3, 000. 00	
June 3, 1896.....	3, 000. 00	
Mar. 2, 1907 (allotted Apr. 1, 1907).....	2, 000. 00	
June 25, 1910 (allotted July 28, 1910).....	500. 00	
Mar. 4, 1913 (allotted June 3, 1913).....	250. 00	
Transferred from Greenwich Harbor (1903).....	270. 00	
		<u>16, 020. 00</u>

Total of appropriations..... 35, 404. 00

Receipts from sale of steamer *Castle*..... 126. 13

Grand total..... 35, 501. 12

COMMERCIAL STATISTICS.

[Compiled for calendar year 1916 from reports furnished by shippers and receivers.]

Receipts and shipments.

FIVEMILE RIVER HARBOR.

	Short tons.
Oysters.....	1, 821
Oyster shells.....	485
Miscellaneous.....	192
Total.....	<u>2, 498</u>

Valuation, \$31,399.00.

Of the above amount, 1,124 tons were shipments.

The tonnage shows a decrease of 7,620 tons, or about 75 per cent from that reported for 1914, mainly in oysters. The tonnage, being dependent almost entirely upon the oyster industry, is variable, during the past 14 years having varied from a minimum of 2,498 short tons in 1915 to a maximum of 22,265 short tons in 1909.

STAMFORD HARBOR.

East Branch:	Short tons.
General merchandise.....	76, 171
Coal.....	104, 313
Sand, stone, gravel, and clay.....	51, 496
Lumber.....	7, 676
Building materials.....	5, 209
Miscellaneous.....	1, 291

Total for East Branch (of which 21,672 tons were shipments).... 246, 156

Valuation, \$16,956,697.99.

West Branch:

Coal.....	49, 658
Acids and containers.....	20, 400
Earths, ores, etc.....	14, 853
Sand, stone, and clay.....	21, 381
Petroleum products.....	4, 020
Miscellaneous.....	300

Total for West Branch (of which 11,930 tons were shipments).... 110, 612

Valuation, \$887,112.05.

Total tonnage for Stamford Harbor, 356,768.

RIVERS AND HARBORS—NEW LONDON, CONN., DISTRICT. 1953

Total valuation for Stamford Harbor, \$17,843,810.04.

Number of passengers carried, 11,110.

The tonnage for the entire harbor shows an increase of about 35 per cent over that reported for 1914, the percentage of increase being about equal in each branch.

One regular line of steamers, landing in the East Branch and carrying freight and passengers, makes daily trips to New York throughout the year, with additional service for about three months during the summer.

[Furnished by collector of customs at Bridgeport, Conn.]

Value of imports	\$10,922.00
Duty on imports	1,934.25
Foreign vessels:	
Entered	8
Cleared	1
American vessels from foreign ports:	
Entered	2
Cleared	1

SOUTHPORT HARBOR, CONN.

There was practically no tonnage for 1915, 20 tons of shellfish only being reported, valued at \$1,200. The decrease is largely due to the closing of the only coal yard receiving by water, all coal at this locality having been handled by rail. The harbor is used by a considerable number of small pleasure craft, and as a refuge by occasional fishing and oyster craft.

GREENWICH HARBOR, CONN.

	Short tons.
Coal	36,872
General merchandise	7,500
Sand and stone	41,750
Building materials	9,550
Lumber	1,160
Total	96,682

Valuation, \$2,656,780.58.

Of the above amount, 1,470 tons, valued at \$202,350, were shipments.

Number of passengers carried, 27,900.

The tonnage shows a decrease of 23,045 tons, or about 19 per cent less than that reported for 1914, mainly in the item of general merchandise.

A regular freight steamer makes triweekly trips to New York during about nine months of the year and daily trips during the remainder of the time. Two small steamers make several trips a day during the summer season between Greenwich and a summer resort on Little Captain Island, about 1½ miles southerly from the entrance to Greenwich Harbor; the passengers reported above were carried by this line, which does very little freight business.

[Furnished by collector of customs, Bridgeport, Conn.]

	Short tons.
Value of imports	\$9,911.00
Duty on imports	780.90
Foreign vessels:	
Entered	1
Cleared	1
American vessels from foreign ports:	
Entered	1
Cleared	1

WESTPORT HARBOR AND SAUGATUCK RIVER.

	Short tons.
Coal	6,068

Valuation, \$25,857.80.

No shipments were reported for 1915.

The tonnage shows a decrease of 9,579 tons, or about 64 per cent, less than reported for 1914. The apparent decrease is mainly due to the refusal of certain receivers of freight to make report.

**IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST NEW YORK,
N. Y., DISTRICT.**

REPORT OF MAJ. M. J. McDONOUGH, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Port Chester Harbor, N. Y.....	1955	13. Narrows of Lake Champlain, N. Y. and Vt.....	1977
2. Mamaroneck Harbor, N. Y.....	1957	14. Hudson River, N. Y.....	1977
3. Larchmont Harbor, N. Y.....	1958	15. Operating and care of lock and dam in Hudson River at Troy, N. Y.....	1986
4. Echo Bay Harbor, N. Y.....	1959	16. Saugerties Harbor, N. Y.....	1988
5. East Chester Creek, N. Y.....	1960	17. Harbors at Rondout and Peek- skill, N. Y.....	1988
6. Westchester Creek, N. Y.....	1962	18. Wappinger Creek, N. Y.....	1991
7. Bronx River, N. Y.....	1963	19. Tarrytown Harbor, N. Y.....	1992
8. East River and Hell Gate, N. Y.....	1964	20. Hudson River Channel, N. Y.	1993
9. Harlem River, N. Y.....	1971		
10. St. Albans Harbor, Vt.....	1974		
11. Plattsburg Harbor, N. Y.....	1975		
12. Burlington Harbor, Vt.....	1975		

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 194 TO 261.

1. PORT CHESTER HARBOR, N. Y.

Dredging under contract with the Eastern Dredging Co. was commenced October 13, 1915, and was completed December 9, 1915. A total of 42,687.7 cubic yards, scow measurement, of material other than broken rock and bowlders and ledge rock, and 9.62 cubic yards, solid measurement, of bowlders one-half to three cubic yards in size, were excavated and disposed of under the contract at a cost of \$8,699.82. This material was removed from the channel below Fox Island.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 528).....	\$91, 500. 00
Existing project:	
June 25, 1910.....	\$45, 000. 00
July 25, 1912.....	10, 000. 00
Mar. 4, 1913.....	15, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	10, 000. 00
March 4, 1915 (allotted Apr. 1, 1915).....	10, 000. 00
July 27, 1916.....	27, 500. 00
	<hr/> 117, 500. 00
Total of appropriations.....	209, 000. 00
Received from sales:	
Previous projects.....	4. 90
Existing project.....	20. 12
	<hr/>
Grand total.....	209, 025. 02
	1955

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CONTRACT IN FORCE.

Contractor: Eastern Dredging Co.

Date of contract: August 14, 1915.

Date of approval: August 28, 1915.

Date fixed for commencement: October 1, 1915.

Date fixed for completion: December 31, 1915.

Amount of contract: Total of contractor's estimates for work done not to exceed about \$8,000.

Unit prices: Material other than broken rock and bowlders and ledge rock, 17½ cents per cubic yard, scow measurement; broken rock and bowlders, ½ to 3 cubic yards in size, \$6 per cubic yard, solid measurement; broken rock and bowlders over 3 cubic yards in size, \$10 per cubic yard, solid measurement.

Contract completed December 9, 1915.

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (Awt.).	
	Amer-ican.	For-ign.	Arriv-als.	Depart-ures.	Least.	Greatest.	Least.	Greatest.
Registered:								
Steamers.....	1	.....	312	312	.....	578	.....	11
Towboats.....	20	.....	95	95	10	70	6	10
Balling vessels.....	5	1	263	263	38	322	4	9
Canal boats, lighters, barges, etc.....	28	.....	149	149	800	834	5	10
Unregistered: Canal boats, lighters, barges, etc.....	23	.....	27	27	400	900	5	10
Miscellaneous craft.....	4	.....	31	31	11	66	5	8

1 Carrying capacity tonnage.

Passengers carried: None reported.

The harbor is also used during the summer season by a number of small pleasure craft.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick (building).....	875,000 brick.	1,750	\$5,256
Brick (fire).....	40 short tons.	80	1,700
Building stone.....	48 cubic yards.	187	48
Cement.....	1,000 barrels.	200	2,000
Gravel.....	2,531 cubic yards.	2,375	5,178
Sand.....	19,822 cubic yards.	26,629	6,484
Crushed stone.....	6,684 cubic yards.	9,951	2,588
Paving blocks (asphalt).....	215,900 blocks.	1,619	72,724
Lumber and timber (sawed).....	3,313,434 feet b. m.	4,970	2,377
Lath.....	6,178 bundles.	77	180,000
Iron (pig and scrap).....	13,000 short tons.	13,000	6,000
Structural steel.....	100 short tons.	100	2,300
Other metal manufactures.....	10 short tons.	10	3
Pipe (wrought iron).....	3 short tons.	3	1,000
Fruits.....	500 barrels.	62	1,250
Vegetables.....	550 barrels.	69	1,250
Flour.....	300 barrels.	33	1,800
Sugar.....	85 short tons.	85	8,250
Oysters and clams.....	15,000 barrels.	1,875	49,700
Wine.....	400 gallons.	2	1,200
Alcohol and products.....	10 barrels.	2	1,200
General merchandise.....	91,718 short tons.	91,718	9,844,300
Coal.....	40,218 long tons.	45,044	233,082
Cardboard.....	50 cords.	90	300
Oyster shells.....	225 short tons.	225	6,000
Wool (raw).....	100 short tons.	100	30,000
Clay.....	130 short tons.	130	230
Molding sand.....	3,950 short tons.	3,950	6,000
Gasoline.....	110,000 gallons.	386	16,500
Kerosene.....	12,500 gallons.	44	780
Petroleum products.....	385,785 gallons.	1,437	41,082
Mortar.....	388 short tons.	388	2,707
Plaster.....	608 barrels.	76	848
		208,556	9,676,900

2. MAMARONECK HARBOR, N. Y.

Dredging by the use of Government plant in progress on June 30, 1915, was continued until July 10, 1916, on which date the work was stopped and the plant started en route for Albany, N. Y., for work in the upper Hudson River. A total of 504.2 cubic yards, place measurement, of broken stone, cobblestones, sand, and gravel were removed at a cost of \$1,653.49, all for new work. This material was removed from the section of channel immediately north of Harbor Island.

In November, 1915, a rocky obstruction interfering with navigation near the head of the improvement was removed under open market agreement at a cost of \$45.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 481).....	\$40,000.00
Existing project:	
July 25, 1912.....	\$29,500.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	3,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915).....	14,800.00
July 27, 1916.....	7,000.00
	<hr/> 54,300.00
Total of appropriations.....	94,300.00
Received from sales (existing project).....	28.01
Grand total.....	<hr/> 94,328.01

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).	
	Amer-ican.	For-ign.	Arriv-als.	Depart-ures.	Least.	Greatest.	Least.	Greatest.
Registered:								
Steamers.....	2		200	200		147		7
Towboats.....	12		95	95	10	70	6	10
Sailing vessels.....	2		2	2	50	59		8
Canal boats, lighters, barges, etc.....	21		84	84	200	600	7	11
Miscellaneous craft.....	1		30	30		66		7
Unregistered canal boats, lighters, barges, etc. ¹	11		11	11	450	900	8	10

¹ Carrying capacity tonnage.

Passengers: None reported.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick (building).....	84,000.....	168	\$546
Brick (hollow tile).....	6,060.....	60	781
Building stone.....	40 short tons.....	40	264
Cement.....	400 barrels.....	80	800
Lime.....	23 barrels.....	3	24
Gravel.....	594 cubic yards.....	792	505
Sand.....	3,712 cubic yards.....	4,949	1,850

Freight handled in 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Crushed stone.....	18,580 cubic yards.....	27,870	\$20,612
Lumber and timber (sawed).....	120,696 feet b. m.....	181	2,959
Agricultural implements.....	100 short tons.....	100	3,000
Engines and machinery.....	5 short tons.....	5	1,810
Wire (iron and steel).....	2 short tons.....	2	85
Pipe (wrought iron).....	150 short tons.....	150	6,000
Pipe (cast iron).....	50 short tons.....	50	2,520
Fruits.....	300 barrels.....	38	700
Vegetables.....	250 barrels.....	19	602
Flour.....	1,100 barrels.....	119	8,448
Grain.....	7,500 bags.....	225	9,248
Hay.....	25 short tons.....	25	450
Straw.....	do.....	25	268
Salt.....	50 short tons.....	50	500
Sugar.....	25 short tons.....	25	2,450
Fish.....	35 short tons.....	25	8,479
Horses.....	100 horses.....	48	10,320
Hogs.....	20.....	4	230
Beer and ale.....	300 half barrels.....	38	1,300
Alcohol and products.....	50 barrels.....	9	0,000
Dry goods.....	80 short tons.....	80	4,500
Clothing and woollens.....	75 short tons.....	75	99,975
Cotton goods.....	60 short tons.....	60	30,000
Glassware.....	20 short tons.....	20	900
Pianos.....	3.....	1	750
Rubber goods.....	440 short tons.....	440	184,800
Leather goods.....	18 short tons.....	18	5,400
Drugs and chemicals.....	50 short tons.....	50	2,650
Rope.....	75 short tons.....	75	2,478
Hardware.....	137 short tons.....	137	12,074
General merchandise.....	300 short tons.....	300	60,000
Coal.....	10,643 long tons.....	11,920	47,900
Ashes.....	5,980 cubic yards.....	3,587	4,177
Hides.....	1 short ton.....	1	287
Leather.....	10 short tons.....	10	500
Clay.....	56 short tons.....	56	546
Tobacco.....	7 short tons.....	7	1,374
Oils (lubricating).....	350 gallons.....	1	55
Oils (essential).....	1,000 gallons.....	4	280
Gasoline.....	2,600 gallons.....	9	240
Kerosene.....	3,400 gallons.....	12	202
Turpentine.....	1,800 gallons.....	7	714
Other petroleum products.....	48,806 gallons.....	178	6,484
Coal tar.....	780 short tons.....	780	4,196
Fertilizer (chemical).....	do.....	780	26,520
Manure.....	8 short tons.....	8	11
Chalk and whiting.....	2,300 short tons.....	2,300	98,900
Sulphur.....	8 short tons.....	8	264
Plaster.....	2,150 bags.....	108	1,105
Wagons.....	80.....	40	6,000
Stoves.....	100.....	25	975
Pumice stone.....	662 short tons.....	662	10,437
Rubber.....	830 tons.....	890	418,000
Mortar.....	34 short tons.....	34	158
Total.....		57,588	1,132,800

3. LARCHMONT HARBOR, N. Y.

There were no operations during the fiscal year. The amount expended (\$84.85) was in payment of the cost of inspecting the work and in part payment of office expenses.

The last work undertaken here was completed on December 5, 1910.

The object of the project seems to have been fulfilled, and by direction of the Chief of Engineers no further expenditures will be made on this project and no further reports will be submitted.

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APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 475).....	\$5, 000
Present project:	
Mar. 3, 1899.....	\$50, 000
June 13, 1902.....	10, 000
Mar. 3, 1905.....	5, 000
Mar. 2, 1907.....	14, 000
	<hr/> 79, 000
Total of appropriations.....	84, 000
Deduct on account of transfer to other works under act of Mar. 4, 1915.....	8, 000
Net total.....	<hr/> 81, 000

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels in fleet of Larchmont Yacht Club in 1915.

Classes.	Number.	Length. ¹	Draft. ¹
Schooners.....	16	41-161	4-17
Sloops, cutters, and yawls.....	55	25-118	2-14
Power yachts.....	69	20-140	1- 6
Steam yachts.....	26	60-300	3-16
Barks.....	1	216	16
House boats.....	5	60-103	2- 8
Auxiliary power boats.....	23	28-197	2-17
Total.....	<hr/> 305		

¹ Dimensions are to the nearest foot.

There is no record showing the number or type of other vessels that used this harbor in 1915.

4. ECHO BAY HARBOR, N. Y.

There were no operations during the fiscal year, expenditures for maintenance having been deemed unnecessary. The expenditures were in payment of the cost of making an examination of the dredged channel; in making minor surveys; and in part payment of office expenses, and amounted to \$596.76.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 446).....	\$51, 000. 00
Existing project, June 25, 1910.....	22, 110. 00
Total of appropriations.....	<hr/> 73, 110. 00
Deduct on account of transfer to other works under act of Mar. 4, 1915.....	4, 000. 00
Net total.....	<hr/> 69, 110. 00
Received from sales:	
Previous projects.....	1. 25
Existing project.....	47. 09
Total.....	<hr/> 69, 158. 34

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).		Passengers carried.
	American.	Foreign.	Arrivals.	Departures.	Least.	Greatest.	Least.	Greatest.	
Registered:									
Steamers.....	5	.....	2,170	2,170	53	345	7	8	98,774
Towboats.....	19	.....	110	110	63	79	6	10	.....
Sailing vessels.....	5	.....	22	22	67	567	6	16	.....
Canal boats, lighters, barges, etc.....	127	.....	158	158	160	900	7	10	.....
Miscellaneous craft.....	3	.....	53	53	66	223	6	18	.....
Unregistered canal boats, lighters, barges, etc. ¹	3	.....	6	6	500	600	8	10	.....

¹ Carrying capacity tonnage.*Freight handled in 1915.*

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick (building).....	604,000 brick.....	1,936	88,718
Brick (hollow tile).....	6,400 brick.....	80	604
Cement.....	5,880 barrels.....	1,178	6,671
Gravel.....	73 cubic yards.....	97	73
Sand.....	1,149 cubic yards.....	1,632	810
Crushed stone.....	1,300 cubic yards.....	1,800	1,680
Lumber and timber (sawed).....	1,488,518 feet b. m.....	2,233	32,682
Lath.....	5,993 bundles.....	75	2,088
General merchandise.....	16,000 short tons.....	16,000	1,000,000
Coal.....	66,196 long tons.....	74,138	230,097
Cord wood.....	144 cords.....	259	818
Oil (lubricating).....	400 gallons.....	1	200
Gasoline.....	35,000 gallons.....	122	5,800
Kerosene.....	200 gallons.....	1	20
Petroleum products.....	1,522,870 gallons.....	5,560	186,163
Plaster.....	220 barrels.....	28	319
Plaster board.....	4,900 pieces.....	32	360
Mortar.....	136 tons.....	195	1,506
Total.....		104,518	2,042,530

5. EAST CHESTER CREEK, N. Y.

The removal by Government plant of scattering points of rock in the vicinity of Goose Island uncovered by previous dredging and of similar points of rock shown by survey to exist near the mouth of the creek was commenced February 16, 1916. The work consisted in drilling and blasting ledge rock and in dredging this rock, and also material which could not be removed by the hydraulic dredge employed on the work during the winter of 1914-15. Operations were suspended April 14, 1916, and the plant was transferred to the Harlem River, where there was a pressing need for its employment. There were removed from the channel a total of 1,357.8 cubic yards of material, consisting of blasted ledge rock, boulders, hard-packed material, and some sand and mud. The points of rock were so scattered and each of such small volume as to make it impracticable to determine what proportion of the material removed consisted of

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blasted ledge rock. The total cost of this work was \$3,719.57; of this amount \$1,183.43 was expended in drilling and blasting, and \$2,536.14 was expended in dredging. The unit cost was \$2.74 per cubic yard.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 445)----- \$115,500.00

Existing project:

June 25, 1910 (allotted Aug. 10, 1910)-----	\$24,000.00
Feb. 27, 1911-----	10,000.00
July 25, 1912-----	10,000.00
Mar. 4, 1913-----	20,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	20,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)-----	5,000.00
July 27, 1916-----	8,000.00

95,000.00

Total of appropriations----- 210,500.00

Received from sales:

Previous projects-----	2.00
Existing project-----	36.71

Grand total----- 210,532.71

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).	
	Amer-ican.	For-eign.	Arriv-als.	Depart-ures.	Least.	Greatest.	Least.	Greatest.
Registered:								
Towboats.....	19	.....	200	230	42	117	6	12
Balling vessels.....	3	.....	3	3	80	90	8	10
Canal boats, lighters, barges, etc.....	42	.....	199	199	225	600	6	8
Miscellaneous craft.....	1	.....	10	10	.....	64	.....	6
Unregistered: ¹								
Canal boats, lighters, barges, etc.....	51	.....	119	119	150	500	6	8
Miscellaneous craft.....	2	.....	14	14	43	66	3	3

¹ Carrying capacity tonnage.

Passengers carried: None.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Cement.....	11,508 barrels.....	2,301	\$17,269
Crushed stone.....	15,900 cubic yards.....	23,856	12,736
Flashing.....	1,250 short tons.....	1,180	9,008
Paving block (asphalt).....	79,000 blocks.....	525	3,008
Lumber and timber (sawed).....	121,558 feet b. m.....	183	4,008
Shingles.....	26,975 bundles.....	869	40,400
Flax.....	15,982 ties.....	1,518	13,543
Coal.....	86,245 long tons.....	89,574	448,727
Coke.....	417 short tons.....	417	1,443
Card wood.....	93 cords.....	167	561
Oil (lubricating).....	2,232 gallons.....	8	1,115
Gasoline.....	136,775 gallons.....	500	22,578
Kerosene.....	139,475 gallons.....	440	8,420
Petroleum products.....	4,461,926 gallons.....	17,860	180,490
Condents.....	256 short tons.....	256	3,072
Total.....		129,796	776,331

6. WESTCHESTER CREEK, N. Y.

The only work done during the year consisted in the removal of a number of rock points endangering navigation in the vicinity of the Unionport Bridge; the cost of this work was \$381.95. It was prosecuted by the use of a hired lighter and the hire of labor. Further work of improvement is awaiting the completion of a bridge at Unionport now under construction by the city of New York in the vicinity of which a small amount of ledge rock remains to be removed to secure the full projected width.

APPROPRIATIONS.

June 25, 1910.....	\$10,000.00
Feb. 27, 1911.....	32,780.00
July 25, 1912.....	12,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	86,500.00
Total of appropriations.....	91,280.00
Receipts from sales.....	15.75
Total.....	91,295.75

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).	
	Amer-ican.	For-eign.	Arriv-als.	Depart-ures.	Least.	Greatest.	Least.	Greatest.
Registered:								
Steamers.....	2		2	2	175	200	6	7
Towboats.....	32		316	316	7	97	7	10
Sailing vessels.....	2	1	3	2	260	260		10
Canal boats, lighters, barges, etc..	149		166	166	103	600	6	12
Unregistered: ¹ Canal boats, lighters, barges, etc.	172		252	252	180	1,000	5	11
Miscellaneous craft.....	1		8	8		66		6

¹ Carrying capacity tonnage.

Passengers carried: None.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick (building).....	1,773,000.....	3,546	\$9,206
Cement.....	15,110 barrels.....	3,022	21,785
Lime.....	1,000 barrels.....	125	1,000
Gravel.....	14,845 cubic yards.....	19,798	5,555
Sand.....	18,161 cubic yards.....	24,215	12,598
Crushed stone.....	39,574 cubic yards.....	59,811	32,865
Flagging.....	3,063 short tons.....	3,063	22,539
Lumber and timber (sawed).....	1,452,525 feet b. m.....	2,179	34,576
Cast-iron manufactures.....	420 short tons.....	420	10,500
Coal.....	57,787 long tons.....	64,721	242,708
Ashes.....	49,555 cubic yards.....	35,067	5,538
Petroleum products.....	1,556,328 gallons.....	5,320	95,936
Flour.....	500 short tons.....	500	2,750
Total.....		220,912	498,808

7. BRONX RIVER, N. Y.

Dredging under contract with the Coastwise Dredging Co., dated November 12, 1913, was completed February 18, 1916, by the removal of a large shoal in and above the mouth of the river, for which the contractor was responsible and which was removed by him free of cost to the United States.

On June 25, 1915, the Board of Estimate and Apportionment of the city of New York authorized condemnation proceedings for acquiring the lands necessary to secure to the United States the right of way for the adopted channel, this action having been taken as a step toward meeting the conditions imposed by the river and harbor act adopting the project for improvement. The city authorities are now awaiting action by the State legislature, necessary for a legal transfer of the lands required.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 414) --	\$98,500.00
Existing project:	
Mar. 4, 1913-----	\$130,000.00
Mar. 4, 1915 (allotment Apr. 1, 1915)-----	100,000.00
July 27, 1916-----	250,000.00
	<hr/> 480,000.00
Total of appropriations-----	578,500.00
Received from sales:	
Previous projects-----	21.75
Existing project-----	22.22
	<hr/>
Grand total-----	578,543.97

CONTRACT IN FORCE.

Contractor: Coastwise Dredging Co.

Date of contract: November 12, 1913.

Date of approval: November 25, 1913.

Date fixed for commencement: March 31, 1914.

Date fixed for completion: March 31, 1916.

Amount of contract: 325,000 cubic yards, plus allowable overdepth dredging, of material other than broken rock and bowlders $\frac{1}{2}$ cubic yard in size or larger, and ledge rock; 75 cubic yards broken rock and bowlders $\frac{1}{2}$ cubic yard to 2 cubic yards in size, not broken up by blasting before removal; 25 cubic yards broken rock and bowlders exceeding 2 cubic yards in size, not broken up by blasting before removal; 5 cubic yards broken rock and bowlders, broken up by blasting before removal. Dredging to be place measurement and bowlders to be solid measurement.

Unit prices: Material other than broken rock and bowlders, 14.7 cents per cubic yard. Broken rock and bowlders not broken up by blasting, $\frac{1}{2}$ to 2 cubic yards in size, \$4 per cubic yard; over 2 cubic yards in size, \$6 per cubic yard. Broken rock and bowlders broken up by blasting, \$10 per cubic yard. Meals, 20 cents each.

Completed February 18, 1916.

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).	
	Amer-ican.	For-eign.	Arriv-als.	Depart-ures.	Least.	Greatest.	Least.	Greatest.
Registered:								
Towboats.....	28	.....	809	800	9	97	7	10
Canal boats, lighters, barges, etc.	206	.....	880	880	130	500	6	7
Unregistered: Canal boats, lighters, barges, etc. ¹	68	.....	1,378	1,378	150	750	6	11

¹ Carrying-capacity tonnage.

Passengers carried: None.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt.....	700 short tons.....	700	\$7,000
Brick (building).....	6,216,000 brick.....	12,432	37,896
Cement.....	99,904 barrels.....	19,981	143,233
Lime.....	35,000 barrels.....	4,375	35,000
Gravel.....	21,743 cubic yards.....	28,991	18,734
Sand.....	168,306 cubic yards.....	225,740	69,282
Crushed stone.....	16,006 cubic yards.....	24,009	12,332
Lumber and timber (sawed).....	2,875,000 feet b. m.....	4,313	67,688
Lath.....	80,483 bundles.....	1,088	28,579
Piles or legs.....	234,150 linear feet.....	1,600	16,390
Ties.....	8,435 ties.....	860	6,487
Engines and machinery.....	60 short tons.....	60	16,000
Steel manufactures.....	178 short tons.....	178	7,000
Structural steel.....	4,110 short tons.....	4,110	168,495
Pipe (wrought iron).....	600 short tons.....	600	18,000
Pipe (cast iron).....	224 short tons.....	224	5,116
Coal.....	246,041 long tons.....	275,566	1,064,480
Ashes ¹	38,071 cubic yards.....	23,848	2,455
Cellar dirt ¹	401,625 cubic yards.....	535,500	12,040
Total.....		1,164,000	1,232,725

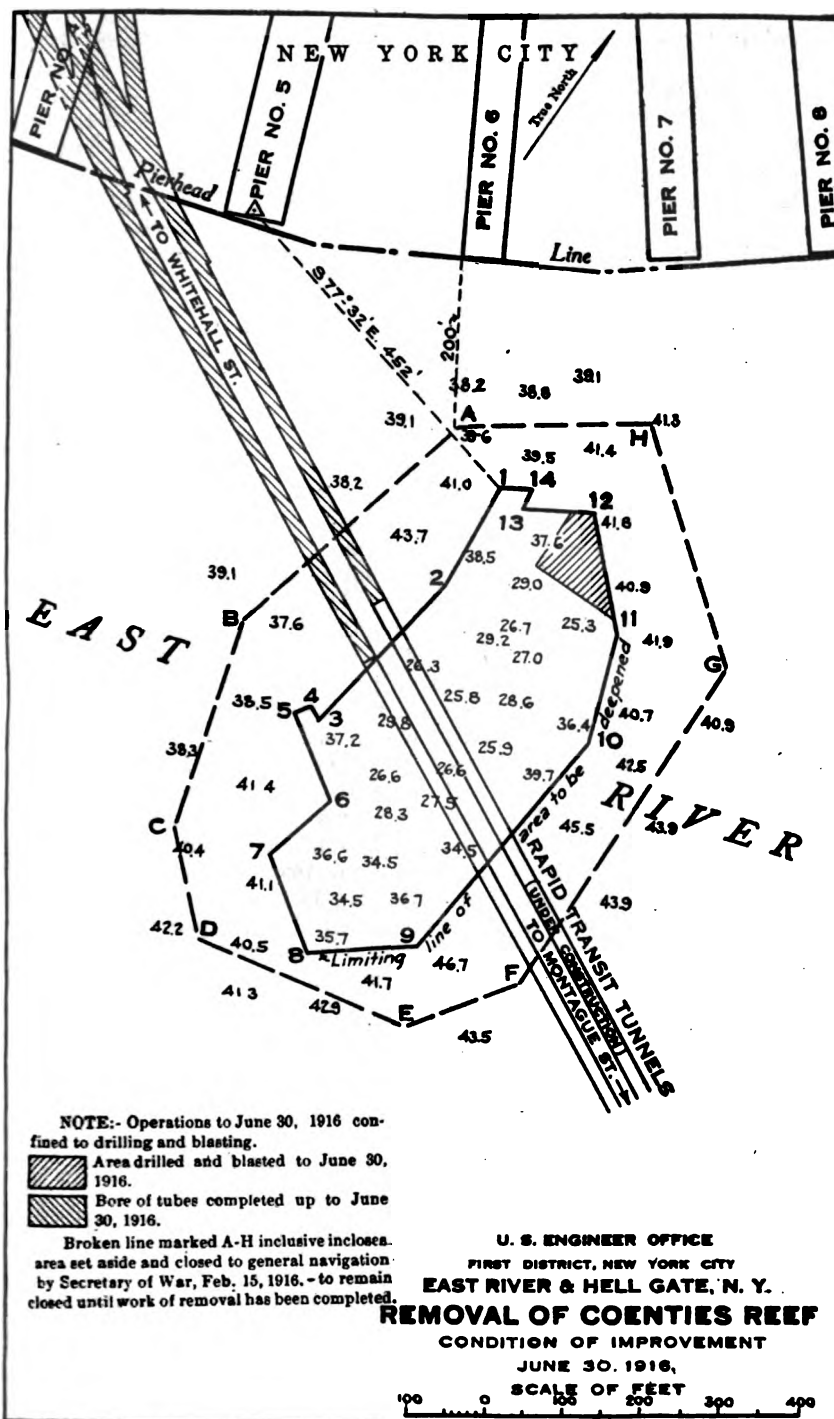
¹ Used for reclaiming marsh land.

8. EAST RIVER AND HELL GATE, N. Y.

(A) BATTERY TO THROGS NECK.

The contract with Timothy J. Dady, dated May 23, 1912, and supplemental agreement, dated May 27, 1914, for dredging and rock removal in making a channel 800 feet wide and 26 feet deep at mean low water between North and South Brother Islands were completed January 13, 1916. There were removed during the fiscal year 1,809,485 cubic yards of ledge rock at a cost of \$21,742.18.

Under contract with Eugene Breymann, dated October 25, 1913, for dredging and rock removal in Battery Reef, work was suspended April 18, 1914, and resumed August 12, 1914. It was again suspended October 15, 1914, and was resumed October 1, 1915. The contract was completed October 13, 1915, by the removal of 24.6 cubic yards, place measurement, of ledge rock which represented the



work remaining to be done when work was suspended October 15, 1914. The cost of this work was \$442.80.

Under contract with Smith & Baxter (Ltd.), dated March 19, 1915, for construction of a motor launch, at a cost of \$5,071, work was begun April 1, 1915, and was completed November 5, 1915, at a cost of \$4,946 including the cost of authorized additions and modifications amounting to \$475; a deduction of \$600 was made from the contract price on account of deficient speed.

Under contract entered into May 18, 1915, with Ruggles-Robinson Co. for the construction of a general storehouse and an oil and paint storehouse, both of fireproof construction, for constructing a timber boat shed, and for furnishing and installing necessary equipment, at a cost of \$41,133.50, exclusive of foundations, actual work of construction at the site was commenced July 12, 1915. The contract was completed January 13, 1916, at a cost of \$39,233.55. A deduction of \$1,552 was made from the contract price under supplemental contract omitting parts of the equipment, and deductions amounting to \$619.12 were made to cover reductions made in the number of load tests specified and in the amount of sidewalk to be constructed; and also to cover the cost of superintendence and inspection to the United States after the date fixed for completion.

At Mill Rock material removed from the Harlem River at Macombs Dam bridge by the use of Government and hired plant, and hired labor, was utilized as fill and in the construction of retaining walls, this work also being done by hired labor. There were disposed of in doing this work 925 cubic yards, loose measurement, of rock, and other material at a cost of \$1,020.73. There was also used in this work 161 cubic yards of ledge rock drilled and blasted on Great Mill Rock at a cost of \$524.86.

The river and harbor act of March 4, 1915, provided for the collection and removal of drift from New York Harbor and its immediate tributaries. Government and hired plant in the employ of the second New York district picked up and disposed of during the year 10,286 cubic feet of drift in the East River at a cost of \$807.24.

In order to determine the extent to which navigation in the East River is endangered by uncharted rocks, it is necessary that all areas in which it appears such rocks may exist should be covered by sweeping. Pinnacles of rock whose existence was theretofore unknown have been located within the past three years by this method, and the presence of others has become known only after being struck by passing vessels. Surveys during the year were confined to the location, by sweeping, of obstructions reported from time to time as having been struck by passing vessels, and to an examination by survey of a portion of Coenties Reef to secure data needed in connection with its proposed removal.

A large number of hitherto unknown rock pinnacles and other equally dangerous obstructions were located by the United States Coast and Geodetic Survey during the past year in a section of the river east of Hell Gate where examination by the use of a wire drag was feasible. Many of these obstructions lie close to or directly in the path taken by vessels in approaching and leaving New York Harbor. Depths of 20 to 24 feet were found in several places where existing charts show depths from 8 to 47 feet greater.

APPROPRIATIONS.

By other than river and harbor acts prior to 1852----	\$13,861.59	
Previous project (see H. Doc. No. 1491. 63d Cong., 3d sess., p. 446)-----	20,000.00	\$33,861.59
Existing project:		
June 30, 1868 (allotted July 25, 1868)-----	85,000.00	
Apr. 10, 1869 (allotted May 11, 1869)-----	¹ 178,841.45	
July 11, 1870-----	250,000.00	
Mar. 3, 1871-----	250,000.00	
June 10, 1872-----	225,000.00	
Mar. 3, 1873-----	225,000.00	
June 23, 1874-----	² 214,000.00	
Mar. 3, 1875-----	250,000.00	
Aug. 14, 1876-----	250,000.00	
June 18, 1878-----	350,000.00	
Mar. 3, 1879-----	250,000.00	
June 14, 1880-----	200,000.00	
Mar. 3, 1881-----	200,000.00	
May 4, 1882-----	50,000.00	
Aug. 2, 1882-----	200,000.00	
July 5, 1884-----	360,000.00	
Aug. 5, 1886-----	112,500.00	
Aug. 11, 1888-----	250,000.00	
Sept. 19, 1890-----	200,000.00	
July 13, 1892-----	150,000.00	
Aug. 18, 1894-----	75,000.00	
June 3, 1896-----	60,000.00	
Mar. 3, 1899-----	250,000.00	
Mar. 3, 1899-----	³ 16.00	
June 13, 1902-----	100,000.00	
Mar. 3, 1905-----	200,000.00	
Mar. 2, 1907-----	250,000.00	
June 25, 1910-----	500,000.00	
Feb. 27, 1911-----	200,000.00	
July 25, 1912-----	100,000.00	
Mar. 4, 1913-----	⁴ 222,000.00	
July 27, 1916-----	200,000.00	
		6,405,357.45
Total of appropriations-----		6,439,219.04
Received from sales and collections, existing project-----		12,448.93
Grand total-----		6,451,667.97

CONTRACTS IN FORCE.

Contractor: Timothy J. Dady.

Date of contract: May 23, 1912.

Date of approval: June 3, 1912.

Date fixed for commencement: July 10, 1912.

Date fixed for completion: January 9, 1916. (Time limit waived.)

Amount of contract: Dredging 21,000 cubic yards, scow measurement; ledge rock and bowlders over 2 cubic yards in size, 14,200 cubic yards; bowlders $\frac{1}{2}$ to 2 cubic yards in size, 50 cubic yards.

Unit prices: Dredging, 27 cents; ledge rock and large bowlders, \$11.73; small bowlders, \$12.

Supplemental contract entered into May 27, 1914, provides for additional work to the extent of removing 7 800 cubic yards of rock and overlying material at the rates named in the contract entered into May 23, 1912.

Contract completed January 13, 1916.

¹ Allotment of \$178,200, of which \$1,358.55 was returned to Treasury.

² Appropriation of \$225,000, of which \$11,000 was allotted to Harlem River, N. Y.

³ Special act to cover claim allowed by Auditor, War Department.

⁴ Appropriation of \$250,000, of which \$28,000 was allotted for removal of Coenties Reef, East River, N. Y.

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Contractor: Eugene Breymann.

Date of contract: October 25, 1913.

Date of approval: November 25, 1913.

Date fixed for commencement: March 29, 1914.

Date fixed for completion: March 29, 1916.

Amount of contract: 209,000 cubic yards plus allowable overdepths of dredging material other than broken rock and bowlders and ledge rock; 125 cubic yards of bowlders $\frac{1}{2}$ to 3 cubic yards in size; and 5,425 cubic yards of ledge rock and bowlders over 3 cubic yards in size. Dredging to be scow measurement, bowlders to be solid measurement, and ledge rock to be place measurement.

Unit prices: Dredging, 35 cents per cubic yard. Bowlders exceeding 3 cubic yards in size and ledge rock, \$18 per cubic yard. Bowlders $\frac{1}{2}$ to 3 cubic yards in size, \$10 per cubic yard.

Contract completed October 18, 1915.

Contractor: Smith & Baxter.

Date of contract: March 19, 1915.

Date of approval: March 23, 1915.

Date fixed for commencement: April 16, 1915.

Date fixed for completion: August 17, 1915. (Time limit waived.)

Amount of contract: Constructing and delivering one first-class motor launch to be named *Captain George T. Derby*.

Contract price, \$5,071.

Contract completed November 5, 1916.

Contractor: Ruggles-Robinson Co.

Date of contract: May 18, 1915.

Date of approval: May 25, 1915.

Date fixed for commencement: July 11, 1915.

Date fixed for completion: December 12, 1915. (Time limit waived.)

Amount of contract: Constructing general storehouse, smooth-faced tile construction, complete with drains, manholes, etc., as required; oil and paint storehouse, smooth-faced tile construction, complete with drains, etc., as required; constructing boat shed; furnishing and erecting steel fence around boat shed; constructing concrete sidewalks (250 square yards); furnishing and erecting 2 flagstaffs; load tests on 6 panels.

Unit prices: General storehouse, \$34,942; oil and paint storehouse, \$3,288; boat shed, \$1,890; steel fence, \$294; sidewalks, \$1.35 per square yard; erecting 2 flagstaffs, \$287; load tests, \$100 per panel.

Contract completed January 18, 1916.

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels. ¹		Draft (feet).		Passengers carried.
	American.	Foreign.	Arrivals.	Departures.	Least.	Greatest.	Least.	Greatest.	
Registered:									
Steamers and ferry-boats.....	685	362	232,908	233,106	22	8,261	5	29	23,610,934
Towboats.....	150		55,925	55,970	14	120	6	17	
Sailing vessels.....	473	74	855	855	28	1,908	3	23	
Canal boats, lighters, barges, etc.....	8,417		63,166	62,927	24	2,350	2	15	
Miscellaneous craft.....	1,469		7,427	7,905	5	1,136	2	17	
Unregistered:									
Steamers.....	3		427	427	44	178	7	11	
Sailing vessels.....	5		5	5	90	650	3	14	
Canal boats, lighters, barges, etc.....	4,740		30,046	30,594	70	2,300	2	14	
Miscellaneous craft.....	3		3	3	4	10	5	6	

¹ Carrying capacity tonnage.

² Displacement tonnage.

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Yachts (steam, gas, and sail) are not included in the above list. It is impracticable to ascertain their number.

Of the foregoing the following passed through Hell Gate:

Class.	Number of vessels.		Total number.		Tonnage of vessels. ¹		Draft (feet).		Passengers carried.
	Ameri-can.	For-eign.	Arriv-als.	Depart-ures.	Least.	Greatest.	Least.	Greatest.	
Registered:									
Steamers and ferry-boats.....	138	.....	49,755	49,755	88	5,980	6	22	3,963,040
Towboats.....	150	.....	9,255	9,255	14	111	6	15	.....
Bailing vessels.....	190	73	284	284	70	1,908	6	21	.....
Canal boats, lighters, barges, etc.....	1,760	.....	5,781	5,559	24	2,283	3	15	.....
Miscellaneous craft.....	910	.....	716	826	5	56	3	17	.....
Unregistered canal boats, ¹ lighters, barges, etc.....	244	.....	6,785	6,783	70	2,000	3	14	.....

¹ Total carrying capacity tonnage.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt.....	26,240 short tons.....	26,240	\$271,196
Brick (building).....	396,066 M brick.....	793,392	2,939,332
Brick (hollow tile).....	282,198 short tons.....	282,198	1,394,896
Brick (fire).....	33,676 short tons.....	33,676	357,740
Marble.....	38,076 short tons.....	38,076	1,128,815
Building stone.....	107,080 short tons.....	107,080	780,579
Cement.....	5,349,825 barrels.....	1,069,965	7,713,382
Lime.....	1,022,061 barrels.....	127,758	1,107,846
Gravel.....	888,421 cubic yards.....	1,184,561	551,595
Sand.....	2,238,351 cubic yards.....	3,064,468	1,004,779
Crushed stone.....	703,484 cubic yards.....	1,055,225	621,642
Riprap.....	446,355 cubic yards.....	609,532	313,058
Flagging.....	74,549 short tons.....	74,549	927,773
Paving blocks (wood).....	192 M blocks.....	800	7,417
Paving blocks (asphalt).....	5,185 M blocks.....	38,888	113,653
Paving blocks (stone).....	77,696 short tons.....	77,696	888,483
Lumber and timber (sawed).....	459,661,208 feet b. m.....	699,492	13,667,711
Shingles.....	1,682,976 bundles.....	39,574	1,191,480
Lath.....	1,438,496 bundles.....	17,981	876,921
Piles or logs.....	3,699,280 linear feet.....	27,390	552,572
Ties.....	242,283 ties.....	23,016	197,575
Sewer pipe.....	206 short tons.....	206	3,786
Slag.....	102,244 short tons.....	102,244	4,488
Agricultural implements.....	13,439 short tons.....	13,439	1,763,900
Engines and machinery.....	87,363 short tons.....	87,363	9,105,505
Aluminum (sheet, bar, ingot, etc.).....	41 short tons.....	41	8,200
Copper ore.....	496,390 short tons.....	496,390	140,309,706
Copper (sheet, bar, wire, etc.).....	241,123 short tons.....	241,123	75,815,525
Copper (ingot).....	265,320 short tons.....	265,320	85,596,000
Copper sulphate.....	150,000 short tons.....	150,000	1,500,000
Copper manufactures.....	15,687 short tons.....	15,687	2,876,220
Iron ore.....	9,319 short tons.....	9,319	25,449
Iron (pig and scrap).....	136,326 short tons.....	136,326	2,017,044
Iron (sheet, bar, etc.).....	1,710 short tons.....	1,710	161,943
Iron oxide.....	5,947 short tons.....	5,947	61,452
Cast iron (manufactured).....	20,407 short tons.....	20,407	812,965
Steel (ingot, sheet, bar, etc.).....	8,632 short tons.....	8,632	293,629
Steel manufactures.....	731,661 short tons.....	731,661	31,914,372
Structural steel.....	85,006 short tons.....	85,006	2,492,273
Wire (iron and steel).....	64,978 short tons.....	64,978	5,502,726
Lead (sheet, bar, ingot, etc.).....	34,572 short tons.....	34,572	3,613,772
Lead manufactures.....	39,573 short tons.....	39,573	6,252,421
Other metals (sheet, bar, etc.).....	89,056 short tons.....	89,056	21,527,162
Other metal manufactures.....	872 short tons.....	872	217,325
Pipe (wrought iron).....	7,301 short tons.....	7,301	281,203
Pipe (cast iron).....	1,363 short tons.....	1,363	58,222
Pipe (steel).....	4 short tons.....	4	239
Fruits.....	127,820 short tons.....	127,820	9,351,454
Vegetables.....	178,963 short tons.....	178,963	5,424,206
Flour.....	6,440,474 barrels.....	695,571	47,886,939
Grain.....	1,174,986 short tons.....	1,174,986	43,701,532

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Freight handled in 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Hay.....	1,021,549 short tons.....	1,021,549	\$21,687,763
Straw.....	1,643 short tons.....	1,643	24,642
Salt.....	84,397 short tons.....	84,397	1,687,738
Sugar.....	2,144,510 short tons.....	2,144,510	192,404,478
Fish.....	35,893 short tons.....	35,893	1,078,099
Oysters and clams.....	28,461 bushels.....	1,181	30,843
Ice.....	810,284 short tons.....	810,284	1,746,554
Horses.....	3,588 horses.....	2,159	899,500
Cattle.....	227,351 head.....	113,676	26,833,976
Sheep.....	118,427 sheep.....	8,852	2,131,896
Poultry.....	128 short tons.....	128	47,232
Beer and ales.....	52,042 barrels.....	13,010	481,488
Wine.....	282,390 gallons.....	1,130	1,129,560
Alcohol and products.....	69,104 short tons.....	69,104	3,271,040
Dry goods.....	8,225 short tons.....	8,225	9,487,155
Clothing and woolsens.....	2,787 short tons.....	2,787	697,686
Cotton goods.....	1,129 short tons.....	1,129	353,608
Glassware.....	4,990 short tons.....	4,990	374,285
Pianos.....	639 short tons.....	639	170,870
Rubber goods.....	40,238 short tons.....	40,238	4,379,343
Leather goods.....	10,584 short tons.....	10,584	4,064,385
Drugs and chemicals.....	277,938 short tons.....	277,938	8,197,622
Clay manufactures.....	14,689 short tons.....	14,689	1,286,644
Rope.....	7,842 short tons.....	7,842	1,926,167
Hardware.....	3,539 short tons.....	3,539	582,310
General and miscellaneous.....	14,122,810 short tons.....	14,122,810	3,090,357,032
Coal.....	28,198,002 long tons.....	31,581,762	120,973,576
Coke.....	12,677 long tons.....	14,188	67,188
Cardwood.....	26,807 cords.....	12,406	111,629
Asbes.....	5,760,581 cubic yards.....	3,917,208	978,175
Garbage.....	220,000 short tons.....	220,000	60,100
Cellar dirt.....	2,308,061 cubic yards.....	3,077,415	196,781
Oyster shells.....	6,000 bushels.....	158	120
Wool (raw).....	33,729 short tons.....	33,729	9,963,536
Cotton (raw).....	202,974 short tons.....	202,974	30,436,450
Hides.....	39,573 short tons.....	39,573	15,329,200
Leather.....	10,083 short tons.....	10,083	8,065,215
Dyewoods.....	97,324 short tons.....	97,324	6,911,322
Wood pulp.....	998 short tons.....	998	13,475
Clay.....	38,426 short tons.....	38,426	271,585
Molding sand.....	41,263 short tons.....	41,263	60,064
Tobacco.....	14,792 short tons.....	14,792	3,075,686
Oil (lubricating).....	26,563,034 gallons.....	102,253	8,932,238
Oil (essential).....	6,876,486 gallons.....	27,504	1,138,682
Gasoline.....	21,667,429 gallons.....	88,196	2,269,411
Kerosene.....	15,900,337 gallons.....	68,030	886,089
Turpentine.....	231,274 gallons.....	924	98,989
Other petroleum products.....	41,156,098 gallons.....	150,205	4,447,076
Coal tar.....	35,842,710 gallons.....	143,400	1,072,543
Fertilizer (chemical).....	32,831 short tons.....	32,831	969,729
Manure.....	227,700 short tons.....	227,700	117,627
Chalk and whiting.....	24,770 short tons.....	24,770	121,089
Sulphur.....	78,826 short tons.....	78,826	2,086,822
Copperage.....	32,277 short tons.....	32,277	999,118
Plaster.....	98,991 short tons.....	98,991	428,670
Molasses.....	9,244,856 gallons.....	38,520	1,646,800
Mortar.....	2,261 short tons.....	2,261	16,117
Paper.....	69,948 short tons.....	69,948	2,378,393
Lime.....	36,252 short tons.....	36,252	2,370,492
Beef scrap, tallow, etc.....	5,941 short tons.....	5,941	639,682
Coffee, tea, and cocoa.....	111,765 short tons.....	111,765	33,400,773
Shipping.....	94,010 short tons.....	94,010	6,198,169
Oil (gas).....	71,873,835 gallons.....	263,730	2,184,455
Water-gas tar.....	7,551,531 gallons.....	30,206	188,788
Bacon.....	126,863 short tons.....	126,863	1,268,330
Silver and gold.....	39,205,204 ounces.....	81	14,310,550
Total.....		74,178,177	4,192,206,408

There was built and launched one battleship of 12,572 tons displacement.

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The above figures may be classified as follows:

	Short tons.	Value.
Traffic in Wallabout Channel, through East River.....	1, 245, 689	\$15, 660, 163
Traffic in Newtown Creek, through East River.....	5, 756, 102	147, 086, 890
Traffic in Harlem River, through East River.....	13, 887, 375	1, 416, 512, 250
Traffic in Flushing Bay, through East River.....	677, 460	1, 006, 295
Through traffic in both directions.....	5, 420, 802	485, 339, 416
Traffic through Hell Gate, exclusive of the foregoing.....	26, 926, 324	157, 097, 730
All other traffic.....	20, 264, 425	1, 969, 503, 694
Total.....	74, 178, 177	4, 192, 206, 406

(B) COENTIES REEF.

The requirements of joint resolution of Congress approved March 8, 1915, having been met by the city of New York by resolution adopted February 4, 1916, and accepted by the Secretary of War on February 14, 1916, contracts were entered into by the United States and by the city of New York with the Great Lakes Dredge & Dock Co., after due advertisement, for the removal of the reef. The contract with the United States provides for the removal of the reef to a depth of 35 feet below mean low water at a lump sum price of \$73,678.04, and the contract with the city of New York provides for the removal of the reef between the planes of 35 feet and 40 feet below mean low water at a lump-sum price of \$123,221.96, all work under both contracts to be in charge of the engineer officer of the Corps of Engineers in charge of the first district, New York City.

Work under the contract was commenced June 7, 1916, and was confined to drilling and blasting. On June 30, 1916, 125 holes had been drilled and blasted over an area of about 4,000 square feet.

APPROPRIATIONS.

Oct. 2, 1914 (allotted Apr. 8, 1915).....	\$236, 000. 00
Mar. 4, 1918 (allotted Apr. 8, 1915).....	28, 000. 00
Total of appropriations.....	264, 000. 00
Received from sales.....	14. 50
Grand total.....	264, 014. 50

CONTRACT IN FORCE.

Contractor: Great Lakes Dredge & Dock Co.

Date of contract: May 22, 1916.

Date of approval: May 25, 1916, by the Chief of Engineers, and June 8, 1916, by the city of New York.

Date fixed for commencement: July 7, 1916.

Date fixed for completion: October 7, 1917.

Amount of contract: Removal of reef to a depth of 40 feet below mean low water for the lump sum of \$196,900, of which the United States is to pay \$73,678.04 for the removal of the reef to a depth of 35 feet below mean low water, and the city of New York is to pay \$123,221.96 for the removal of the

¹ By transfer, authorized by joint resolution of Mar. 8, 1916, of funds appropriated Mar. 4, 1918, for "Removing obstructions in East River and Hell Gate, N. Y."

reef between the planes of 35 and 40 feet below mean low water as provided for in a separate contract between the Great Lakes Dredge & Dock Co. and the city of New York, approved June 8, 1916.

Work under the contract was commenced June 7, 1916.

9. HARLEM RIVER, N. Y.

Under contract with R. G. Packard Co., dated March 8, 1915, and completed January 15, 1916, there were excavated and disposed of during the year 106,692 cubic yards, scow measurement, of material other than broken rock and boulders; 78.04 cubic yards, solid measurement, of broken rock and boulders over 3 cubic yards in size; and 111.08 cubic yards, solid measurement, of broken rock and boulders one-half to 3 cubic yards in size, at a cost of \$24,546.83, of which amount \$12,216.12 was for new work and \$12,330.71 was for maintenance.

Rock excavation in the eastern draw channel at Macombs Dam Bridge by the use of Government plant, consisting of drill scow and auxiliaries, was commenced November 27, 1915, and was still in progress on June 30, 1916. The plant was removed from this work for short periods to drill and blast rock in East Chester Creek, as well as in the Harlem River, about 700 feet south of Sherman Creek and about 1,300 feet west of Broadway Bridge. There were drilled and blasted in the eastern draw channel of Macombs Dam Bridge 11,920 linear feet of holes, at a cost of \$20,711.55. In the area south of Sherman Creek the work consisted of drilling and blasting scattering points of ledge projecting about 2 feet above the depth required under the project, at a cost of \$91.47. In the area west of Broadway Bridge several very large boulders lying within the projected channel limits were drilled and blasted, at a cost of \$234.42.

By the use of Government and hired dredges and scows 9,128.9 cubic yards, scow measurement, of blasted rock and overlying material were excavated and disposed of, at a cost of \$22,226.98. Of this amount 8,944.6 cubic yards were removed from the channel at Macombs Dam Bridge, at a cost of \$22,057.28; 23.5 cubic yards were removed from the area south of Sherman Creek, at a cost of \$46.40; and 160.8 cubic yards of blasted boulders were removed from the area west of Broadway Bridge, at a cost of \$123.30. In disposing of this material 2,671.4 cubic yards were delivered at Mill Rock, in the East River, at a cost of \$1,304.90, and 6,485.8 cubic yards were disposed of in Long Island Sound. The material disposed of at Mill Rock was used in building about 350 linear feet of retaining wall and adding to the useful area of property owned by the United States by carrying about 6,200 square feet of area up to grade +11 mean low-water reference. There were also excavated and disposed of by the use of this plant 13,247.7 cubic yards of material, which had formed an obstructing shoal about 600 feet south of High Bridge. The cost of this work was \$7,001.45.

There was also expended during the year \$143.04 in removing 2,355 cubic feet of drift by the use of plant in the employ of the second New York district.

A description of the land required for straightening the channel at Johnsons Iron Works, with map, was submitted to the Chief of Engineers March 16, 1916.

An investigation was made in October, 1915, of the tidal currents at and in the vicinity of the piers of High Bridge, which afford a channel clearance of but about 44 feet at elevation -5 mean low-water reference. The results show that the piers are a serious menace to navigation. The city authorities have taken the matter of removing one or more of them under advisement.

Proposals for the construction of a combination drill scow and dredge were opened May 28, 1915. They were rejected as excessive on July 26, 1915.

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 463)-----	\$21, 000. 00
Existing project:	
June 18, 1878-----	\$300, 000. 00
Mar. 8, 1879-----	100, 000. 00
Aug. 11, 1888-----	70, 000. 00
Sept. 19, 1890-----	250, 000. 00
July 18, 1892-----	175, 000. 00
Aug. 18, 1894-----	125, 000. 00
June 3, 1896-----	125, 000. 00
Mar. 8, 1899-----	100, 000. 00
June 18, 1902-----	75, 000. 00
Mar. 8, 1905-----	75, 000. 00
Mar. 2, 1907-----	150, 000. 00
Mar. 8, 1909 (allotted Apr. 3, 1909)-----	22, 000. 00
June 25, 1910-----	150, 000. 00
Feb. 27, 1911-----	75, 000. 00
July 25, 1912-----	25, 000. 00
Mar. 4, 1913-----	105, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	50, 000. 00
Mar. 4, 1915 (allotted Apr. 1, 1915)-----	75, 000. 00
July 27, 1916-----	250, 000. 00
	<hr/> 2, 297, 000. 00
Total of appropriations-----	2, 318, 000. 00
Received from sales, etc. (existing project)-----	863. 52
Recovered from failing contractor (existing project)-----	4, 500. 00
	<hr/>
Grand total-----	2, 823, 463. 52

CONTRACT IN FORCE.

Contractor: R. G. Packard Co.

Date of contract: March 8, 1915.

Date of approval: March 10, 1915.

Date fixed for commencement: March 16, 1915; waived to June 15, 1915.

Date fixed for completion: July 15, 1915; waived to January 15, 1916.

Amount of contract: About \$30,000 to be expended in the payment of contractor's estimates.

Unit prices: Dredging at 22.8 cents per cubic yard, scow measurement; broken rock and bowlders $\frac{1}{2}$ to 3 cubic yards in size, \$6 per cubic yard, solid measurement; broken rock and bowlders over 3 cubic yards in size, \$10 per cubic yard, solid measurement.

Contract completed January 15, 1916.

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COMMERCIAL STATISTICS.

Navigation season continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).		Passengers carried.
	Ameri-can.	For-eign.	Arriv-als.	Depart-ures.	Least.	Great-est.	Least.	Great-est.	
Registered:									
Steamers.....	39	.....	11,053	11,053	33	3,000	5	17	454,190
Towboats.....	134	.....	6,226	6,226	17	111	6	15	.....
Sailing vessels.....	69	1	208	208	43	1,333	9	23	.....
Canal boats, lighters, barges, etc.....	2,288	.....	9,604	9,776	60	1,200	2	14	.....
Miscellaneous craft.....	1	.....	10	10	37	37	6	6	.....
Unregistered: ¹									
Sailing vessels.....	2	.....	2	2	319	329	12	14	.....
Canal boats, lighters, barges, etc.....	2,257	.....	6,719	6,719	25	1,000	2	11	.....

¹Carrying capacity tonnage.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt.....	5,268 short tons.....	5,268	\$76,307
Brick (building).....	39,776 M brick.....	79,552	241,303
Brick (hollow tile).....	175,948 short tons.....	175,948	875,240
Brick (fire).....	300 M brick.....	909	6,709
Marble.....	11,676 short tons.....	11,676	241,700
Building stone.....	13,166 short tons.....	13,166	146,919
Cement.....	453,044 barrels.....	90,609	682,322
Lime.....	262,836 barrels.....	37,612	288,470
Gravel.....	27,386 cubic yards.....	36,515	18,549
Sand.....	88,251 cubic yards.....	58,834	49,657
Crushed stone.....	72,372 cubic yards.....	108,558	59,058
Rip-rap.....	38,746 cubic yards.....	58,118	5,728
Flagging.....	2,961 short tons.....	2,961	28,165
Paving blocks (asphalt).....	766,415 blocks.....	5,768	28,170
Lumber and timber (sawed).....	50,580,751 feet b. m.....	75,870	1,327,571
Lath.....	286,059 bundles.....	3,326	79,656
Piles or logs.....	58,920 linear feet.....	507	7,400
Ties.....	5,130 ties.....	489	3,960
Sewer pipe.....	8 short tons.....	8	83
Engines and machinery.....	1,655 short tons.....	1,655	247,650
Iron (pig and scrap).....	114,927 short tons.....	114,927	1,710,098
Iron (sheet, bar, etc.).....	639 short tons.....	639	4,247
Cast iron manufactures.....	423 short tons.....	423	3,400
Steel (ingot, sheet, bar, etc.).....	2,220 short tons.....	2,220	157,620
Steel manufactures.....	22,639 short tons.....	22,639	624,439
Structural steel.....	31,709 short tons.....	31,709	1,252,574
Wire (iron and steel).....	3,594 short tons.....	3,594	305,490
Lead (sheet, bar, ingot, etc.).....	450 short tons.....	450	48,150
Other metal manufactures.....	1 short ton.....	1	155
Pipe (cast iron).....	225 short tons.....	225	12,600
Fruit.....	5,430 barrels.....	679	16,698
Vegetables.....	3,200 barrels.....	673	6,010
Flour.....	4,720,535 barrels.....	534,507	35,273,634
Oatmeal.....	11,873 short tons.....	11,873	434,456
Hay.....	6,751 short tons.....	6,751	147,945
Straw.....	607 short tons.....	607	6,185
Salt.....	6,348 short tons.....	6,348	42,980
Sugar.....	352 short tons.....	352	39,450
Fish.....	15 short tons.....	15	108
Oysters and clams.....	41 short tons.....	41	250
Ice.....	130,000 short tons.....	130,000	325,000
Sheep.....	450 sheep.....	30	7,200
Poultry.....	12 short tons.....	12	2,800
Beer.....	54,000 barrels.....	13,500	22,400
Dry goods.....	50 short tons.....	50	5,600
Clothing and woolsens.....	6 short tons.....	6	1,800
Cotton goods.....	20 short tons.....	20	6,000

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Freight handled in 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Pianos.....	509 pianos.....	212	\$197,640
Leather goods.....	8 s' ort tons.....	3	1,200
Clay manufactures.....	3,894 s' ort tons.....	3,894	30,317
Hardware.....	21 s' ort tons.....	21	6,130
General and miscellaneous.....	5,850,777 s' ort tons.....	5,851,407	1,464,900,661
Coal.....	5,437,787 long tons.....	6,090,318	26,430,579
Coke.....	54,251 long tons.....	60,701	174,505
Cord wood.....	14,129 cords.....	7,850	14,645
Ashes.....	1,720,404 cubic yards.....	1,169,975	173,889
Garbage.....	120,000 cubic yards.....	69,000	33,400
Cellar dirt.....	44,040 cubic yards.....	59,547	9,259
Leather.....	1 s' ort ton.....	1	690
Clay.....	551 short tons.....	551	4,469
Molding sand.....	9,584 s' ort tons.....	9,584	16,211
Oil (lubricating).....	48,226 gallons.....	193	19,038
Kerosene.....	377,506 gallons.....	1,379	20,843
Turpentine.....	1,000 gallons.....	6	370
Other petroleum products.....	18,916,094 gallons.....	69,036	2,383,675
Manure.....	45,000 s' ort tons.....	45,000	45,000
Chalk and writing.....	1,507 s' ort tons.....	1,507	10,598
Empty barrels.....	27,800 barrels.....	278	47,268
Fire proofing.....	2,431 s' ort tons.....	2,431	11,231
Molasses.....	2,000 gallons.....	11	2,000
Mortar.....	1,449 s' ort tons.....	1,449	10,867
Plaster.....	1,017 s' ort tons.....	1,017	8,133
Resin.....	73 short tons.....	73	3,650
Total.....		15,094,169	1,538,504,563
Vessels built and launched.....	5 vessels.....		59,500

10. ST. ALBANS HARBOR, VT.

No operations during the fiscal year.

APPROPRIATIONS.

June 25, 1910..... \$5,000

COMMERCIAL STATISTICS.

Vessels employed in trade in 1915.

Classes.	Number.	Trips.	Tonnage.	Length over all.
Steamers.....	2	247	742-892	Frst. 205-220
Miscellaneous craft.....			25- 75	

Passengers carried, 18,106.

Freight handled in 1915.

Articles.	Short tons.	Value.
General merchandise.....	344	\$30,880
Miscellaneous (estimate 1).....	100	1,800

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11. PLATTSBURG HARBOR, N. Y.

No operations during the fiscal year.

APPROPRIATIONS.

July 4, 1836-----	\$10,000.00	Sept. 19, 1890-----	\$32,500.00
Mar. 3, 1837-----	10,000.00	June 13, 1902-----	5,000.00
July 7, 1838-----	27,500.00	June 25, 1910-----	25,500.00
Mar. 3, 1843-----	2,680.01	Mar. 4, 1913-----	4,000.00
June 11, 1844-----	10,000.00	Mar. 4, 1915 (allotted Apr.	
May 19, 1864 (allotment) _	2,000.00	1, 1915)-----	2,000.00
Mar. 2, 1867-----	26,000.00	July 27, 1916-----	11,000.00
July 11, 1870-----	10,000.00		
Mar. 3, 1871-----	15,000.00	Total-----	233,180.01
June 10, 1872-----	10,000.00	Returned to surplus fund	
Mar. 3, 1873-----	10,000.00	of Treasury-----	390.92
June 23, 1874-----	5,000.00		
Mar. 3, 1879-----	2,000.00	Net total-----	232,789.09
June 14, 1880-----	1,000.00	Receipts from sales-----	360.40
Aug. 5, 1886-----	5,000.00		
Aug. 11, 1888-----	7,000.00	Grand total-----	233,149.49

COMMERCIAL STATISTICS.

Vessels employed in trade in 1915.

Classes.	Number.	Tonnage (maximum).	Draft.
			<i>Fect.</i>
Tugs-----	11	176	12.0
Steamers-----	4	2,700	9.0
Sailing vessels-----	3	70	6.0
Barges and canal boats-----	28	107	6.0

Passengers carried, 118,835.

Freight handled in 1915.

Articles.	Short tons.	Estimated valued.
General merchandise-----	6,178	\$962,500
Lumber-----	630	8,750
Total-----	6,808	971,250

12. BURLINGTON HARBOR, VT.

A diver was employed for four days in making an examination of the substructure cribs of the northern (detached) section of the breakwater, with a view to determining the cause of settlement of the stone superstructure. It was found that with two exceptions the cribs were in good condition and that outside of these two cribs the settlement of the superstructure was due either to stone sifting out from the bottom of the cribs or to spreading of the arched stone

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on top. It is intended to prevent further action of this nature by protecting the lake face of this section of the breakwater by a rubble mound.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 416) - \$508, 490. 20

Existing project:

Aug. 5, 1886.....	\$18, 750. 00	
Aug. 11, 1888.....	35, 000. 00	
Sept. 19, 1890.....	20, 000. 00	
Aug. 18, 1894.....	10, 000. 00	
June 3, 1896.....	10, 000. 00	
Mar. 3, 1899.....	15, 000. 00	
June 6, 1900 (allotted Oct. 16, 1900).....	5, 000. 00	
June 13, 1902.....	57, 750. 00	
Mar. 3, 1905.....	20, 000. 00	
Mar. 4, 1907.....	35, 000. 00	
May 27, 1908.....	16, 855. 00	
June 25, 1910.....	52, 000. 00	
Feb. 27, 1911.....	2, 500. 00	
July 25, 1912.....	2, 000. 00	
Mar. 4, 1913.....	2, 000. 00	
July 27, 1916.....	22, 000. 00	
		323, 855. 00
Total of appropriations.....		832, 335. 20
Returned to surplus fund of Treasury.....		6, 669. 13
Net total.....		825, 666. 07
Received from sales, etc.....		147. 45
Grand total.....		825, 813. 52

COMMERCIAL STATISTICS.

Vessels employed in trade in 1915.

Classes.	Number.	Tonnage.	Draft.
Tugs and steamers.....	15	25-2, 700	Feet. 6-12
Sailing vessels.....	3	70-125	6
Barges and canal boats.....	431	100	6

Freight handled in 1915.

Articles.	Short tons.	Value.
General merchandise.....	7, 931	\$2, 033, 150
Lumber.....	11, 970	100, 250
Coal.....	2, 829	14, 000
Ore tailings.....	554	800
Total.....	23, 284	2, 219, 900

Passengers carried, 118,835.
The passenger traffic is the principal item of commerce of this harbor and is carried largely during the summer season.

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13. NARROWS OF LAKE CHAMPLAIN, N. Y. AND VT.

Operations during the year were confined to the maintenance of the existing fender booms under informal agreement with the Lake Champlain Transportation Co. at a cost of \$30; to the reconstruction of the booms at Putts Rock under informal agreement with A. Florentine & Son at a cost of \$1,447.60; and to inspections of the locality.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 422) -	\$63,500.00
Existing project:	
Mar. 3, 1899	\$5,000.00
June 6, 1900 (allotment of July 31, 1900)	1,500.00
June 13, 1902	17,500.00
Mar. 3, 1905	2,500.00
Mar. 2, 1907	2,500.00
July 25, 1912	6,000.00
Mar. 4, 1913	6,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	3,000.00
	<u>44,000.00</u>
Total of appropriations	107,500.00
Received from sales, etc.	1.50
Grand total	<u>107,501.50</u>

COMMERCIAL STATISTICS.

Vessels employed in trade in 1915.

Classes.	Number.	Tonnage.	Draft.
Tugs and steamers	7	99-176	<i>Fath.</i> 10-12
Baling vessels	15	125	6
Barges and canal boats	600	100	5

In addition, there is a number of small steamers and miscellaneous craft not operated by any regular transportation company; also several lines of ferries and a large fleet of pleasure craft, chiefly motor boats.

Freight handled in 1915.

Articles.	Short tons.	Value.
General merchandise	15,959	\$1,538,647
Coal	145,385	712,491
Lumber	111,724	2,211,944
Pulp wood and cordwood	116,690	575,950
Manufactures	1,393	32,331
Iron ore	28,392	141,900
Stone, lime, and clay	16,350	40,876
Fruits and farm products	1,730	169,645
Salt	168	1,680
Total	<u>437,791</u>	<u>\$5,425,524</u>

14. HUDSON RIVER, N. Y.

The work was carried on under contract and by administration under the following allotments of funds:

- (1) Completion of Troy Lock and Dam and adjacent works.
- (2) Channel excavation from the State Dam to a point just below Troy, N. Y.

- (3) Channel excavation between Albany and Van Wies Point.
- (4) Channel excavation by administration south of Breaker Island.
- (5) Raising of dikes by administration.
- (6) General engineering, etc.

Operations are shown under these captions.

(1) TROY LOCK AND DAM AND ADJACENT WORKS.

The lower and intermediate lock gates were completed in place in July, 1915, and the lock chamber was flooded on August 1, 1915. The first tow passed through on August 3, using the open lock; on August 18, 1915, the gates were closed and the lock operated by temporary machinery. The last of the concrete unit cribs for the construction of the north guide wall was completed on the bank during July. This wall is being constructed of hollow concrete cribs placed on a foundation of bags filled with concrete. After the cribs are in place they are filled with concrete and the separate piers thus formed joined by a continuous superstructure. This work was suspended in November, 1915, due to the coldness of the water, and was not resumed until June, 1916. Work has been started on putting in the slabs connecting these piers and the cribs. About 20 upper cribs are still to be placed. The cofferdam inclosing the east arm of the dam was started late in April, 1915, but due to unseasonable freshets, it could not be made ready for pumping out until September 10. The concreting in this coffer was begun on September 23 and finished on October 29, thus completing the dam. The masonry was 500 feet in length and was completed, including excavation and all appurtenant works, at an average of 100 feet per week. The coffer was flooded on November 3 and its removal started on that date.

The removal of the State Dam, a stone-filled crib structure about 1,080 feet long, was begun on August 16, 1915, and the sloop lock, which had been a landmark for about a century, was finally closed and abandoned in March, 1916. Its upper approach has been filled with spoil. The dam was removed in sections by derrick boats using dump boxes and orange-peel buckets. Protecting cofferdams consisting of banks of sand and gravel were built upstream for each section, and on December 26 the first or westernmost cofferdam was cut on approaching high water. The bank was completely washed away within an hour, allowing the river to flow through. The removal of the remaining portions of the State Dam was continued throughout the winter and spring, but due to severe ice conditions and extended freshets progress was slow. On April 3, 1916, a contractor's dredge and boats were locked down through the new lock and passed through the new channel over the site of the old dam. The final cleaning up will be completed during July, 1916.

The reshipment of the steel piles to the Carnegie Steel Co. and the steel forms to the Blaw Steel Construction Co. was started in November, 1915. The superstructure of the lock-operating house was started in October, 1915, and is now nearing completion. A contract was let to the International Steam Pump Co. on March 31, 1916, for furnishing two duplex air compressors to be installed in the lock-operating house. One of these compressors will be connected through a set of gears to a water turbine and the other will be belt connected to a 60-horsepower gasoline engine. The contract

for the water turbine was awarded to S. Morgan Smith Co., of York, Pa., March 18, 1916, and the turbine was shipped in June following; the installation of the turbine is to commence at once. A gasoline engine was purchased from the Automatic Gas Engine Co., of Bridgeport, Conn., for breakdown service. The design of the machinery for the operation of the lock gates and valves together with the specifications were completed and approved. Proposals for this machinery were issued on June 28 to be opened July 20, 1916.

Miscellaneous clean-up work has progressed rapidly, such as painting lock gates, placing of lamp-posts, setting semaphore signals, building lockmen's shelters, grading behind the lock wall, seeding area graded, etc. The principal items which remain unfinished are the completion of the north guide wall, installation of lock-operating machinery, removal of the machine shop, and construction of lock-master's dwelling.

The principal quantities of material handled and the unit costs during the fiscal year at the Troy Lock and Dam are shown in the following tables:

Quantities.

	Concrete (cubic yards).		Earth (cubic yards). ¹		Rock (cubic yards). ¹	
	Present fiscal year.	Total to date.	Present fiscal year.	Total to date.	Present fiscal year.	Total to date.
Lock.....	2,194	42,646	1,216	27,623	25	7,412
Dam and bulkhead.....	9,060	22,812	2,730	26,036	260	2,231
Total.....	11,129	65,458	3,946	53,659	285	9,643

¹ For excavation in cofferdams only.

Unit costs.

	Concrete per cubic yard.		Earth per cubic yard.		Rock per cubic yard.	
	Present fiscal year.	Average to date.	Present fiscal year.	Average to date.	Present fiscal year.	Average to date.
Lock.....	\$7.26	\$11.80	\$5.97	\$2.70	\$5.60	\$5.40
Dam and bulkhead.....	7.42	11.31	3.96	1.79	11.79	9.66

¹ Exclusive of special work on upper guide wall.

The above reported unit costs include all field costs of labor and materials, concrete forms, cofferdams, plant depreciation, pumping, and field and immediate office supervision.

The hydraulic dredge *DeWitt Clinton* was employed in excavation between the new lock and the State Dam and also in the channel south of the State Dam, the material being placed on spoil banks on shore or used in filling and banking the cofferdams. The dredge was also employed at intervals in supplying sand and gravel for concreting when the Government gravel digging plant was unable to work

on account of ice, breakdowns, etc. About 305,700 cubic yards of material were excavated by this dredge at a total unit cost of 28 cents per cubic yard, including supervision and depreciation. Drill boat *No. 39*, when not needed on other work, was employed in blasting a rock bar in the channel above the dam opposite North Troy and worked over about 254 square yards during a brief period in the fiscal year.

(2) CHANNEL EXCAVATION FROM STATE DAM TO THE SOUTHERN BOUNDARY OF TROY, N. Y.

Under contract with the Great Lakes Dredge & Dock Co., dated October 20, 1913, for dredging and rock removal, work was commenced June 16, 1914. To June 30, 1916, there had been removed, in accordance with contract requirements, 43,545 cubic yards of material of Class I, 29,599 cubic yards of material of Class II, 59.5 cubic yards of material of Class III, and 941,140 cubic yards of material of Class IV, at a total cost of \$582,496.96. There was also removed under this contract approximately an additional 5,000 cubic yards of material over areas which are shoal and which will have to be removed to grade before payment for this work is made.

(3) CHANNEL EXCAVATION BETWEEN ALBANY AND VAN WIES POINT.

Under contract with the Atlantic, Gulf & Pacific Co., dated June 5, 1914, for dredging, work was completed October 5, 1915. There were removed under this contract 1,311,340 cubic yards of sand, gravel, and clay at a cost of \$134,307.68, including engineering and inspection.

(4) CHANNEL EXCAVATION BY ADMINISTRATION SOUTH OF BREAKER ISLAND.

Dredging at Stockport Narrow Channel, Hudson River, from 4 to 6 miles north of Hudson, N. Y., was begun by the hydraulic dredge *Captain Andrew Talcott*, July 7, 1915, and continued until December 10, 1915, when the work was suspended, on account of rapid formation of ice, and the *Captain Andrew Talcott* and auxiliary plant were transferred for temporary employment under the third district, New York City. Between the above dates 326,900 cubic yards of sand were removed at a cost of \$39,600.28, or a unit cost of \$0.121 per cubic yard, including supervision but excluding depreciation of plant. This material was placed on the river flats known as the Middle Ground between the east and west channels.

In February, 1916, the sale of the *Captain Andrew Talcott* and purchase of the new 20-inch dredge *General G. L. Gillespie* was consummated, and the work at Stockport Narrow Channel was resumed by the *General G. L. Gillespie* April 20, 1916, and continued throughout the balance of the fiscal year. During this period 154,160 cubic yards of sand were removed at a total cost of \$24,036.34, or a unit cost of \$0.053 per cubic yard, including supervision but excluding depreciation of plant. The dredged material was deposited as before on the Middle Ground Flats.

Upon completion of hydraulic dredging at Troy in connection with the construction of the Troy Lock and Dam and removal of the old State Dam, the 16-inch hydraulic dredge *De Witt Clinton* commenced work on the section of the Hudson River at Albany known as Bath Crossover. The work was commenced June 9, 1916, and continued to the end of the fiscal year. During this period 16,900 cubic yards of sand were removed between Bath pumping station and the New York Central freight bridge, at a cost of \$2,920, or a unit cost of \$0.173 per cubic yard, including supervision but excluding depreciation. Of this material 4,000 cubic yards were chargeable to maintenance and 12,900 cubic yards to improvement of the channel. This material was deposited along the east bank of the river opposite the area from which removed.

(5) RAISING OF DIKES BY ADMINISTRATION.

This work during the year consisted in raising to the surface slope of a freshet 10 feet above mean low water at Albany the crests of two existing dikes north of Coeymans. South of Coeymans regulation at normal stages alone is considered necessary, because below that place freshets of 10 feet elevation at Albany are not effective. The work involved the construction of superstructures of rubble, paved with concrete, to resist ice action on Campbell Island and Cedar Hill Dikes.

The material placed during the fiscal year was as follows:

	Rubble-stone (cubic yards).	Concrete paving (square yards).
Campbell Island.....		2,680
Cedar Hill.....	693	9,313

The approximate total costs of raising and repairing the above dikes to date and the unit costs of concrete paving, including supervision, depreciation, etc., were:

Dikes.	Total cost.	Cost of concrete paving per square yard.
Campbell Island.....	\$35,700	\$1.65
Cedar Hill.....	48,500	1.50

(6) GENERAL ENGINEERING, ETC.

Topographic surveys from Waterford to the Troy Lock and Dam and hydrographic surveys from Waterford to Hudson, including the back channels, have been completed. The preparation of maps and the inspection of dredging and construction incident to private work done under permit was continued. The river was swept at various points below Albany for snags and obstructions to navigation. Sales

of used plant and materials for which there was no further need have been conducted, and have resulted in the sale of one gravel dredging and screening plant, five electric pumps, two stiff-leg derricks, and many small items of plant equipment.

PLANT.

The following items of floating plant acquired for work and from funds for improving Hudson River were transferred for work in other localities in the first and third districts, New York City, during the closed (winter) season of the upper Hudson River:

U. S. E. D. H. R.	Character of plant.	U. S. E. D. H. R.	Character of plant.
1.....	House boat.	25.....	Dynamite boat (cargo scow).
9.....	Cargo Scow.	31.....	Tug General Totten.
10.....	Do.	39.....	Drift boat.
11.....	Do.	43.....	Cargo scow.
14.....	Pipe-line dredge Captain Andrew Talcott.	44.....	House boat.
16.....	Derrick boat.	45.....	Tug Colonel Thayer.
23.....	Cargo scow.	46.....	Pipe-line dredge General G. L. Gillespie.

The depreciation on this plant while engaged in other localities is to be returned to the appropriation for improving Hudson River, N. Y., by means of rental charges fixed at \$835 per month for the dredging plant and accessories and \$375 per month for the rock drilling and removing plant and accessories.

DISTRIBUTION OF COST.

The cost of work done under the project to the end of the fiscal year is shown by the following summary. In this summary the itemized costs reported include the value of services, materials, and supplies actually used (including such items as still represent unpaid liabilities), cost of immediate supervision, and a depreciation charge on all plant utilized. All of these cost figures contain certain small items which by their nature must be to some extent arbitrary, and therefore items designated cost should be regarded as close approximations only, even though they are given in dollars and cents, in order to accord with the records in the cost accounts from which they were taken.

Improvement:

Troy Lock and Dam and adjacent work by administration.....	\$1, 637, 372. 51
Construction of dikes by contract.....	301, 860. 53
Construction of dikes by administration.....	367, 224. 60
Dredging and rock removal by administration.....	191, 065. 44
Dredging and rock removal by contract No. 1.....	308, 812. 20
Dredging and rock removal by contract No. 3.....	582, 496. 96
Dredging by contract No. 4.....	118, 307. 68
General supervision (including general surveys).....	86, 544. 21
Total cost of Improvement.....	3, 593, 684. 13
Maintenance: Total cost of maintenance, dredging, dike repairing, etc.....	294, 943. 78
Total cost value of Improvement and maintenance.....	3, 888, 627. 86

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Adjustment of costs and expenditures to June 30, 1916:

Total cost of improvement and maintenance as above.....	\$3, 888, 627. 86 .
Remaining value of plant June 30, 1916:	
Floating plant.....	\$290, 634. 62
Shore plant.....	4, 131. 00
	294, 765. 62
Depreciation on plant for work on other projects.....	4, 638. 00
Reimbursement for use of plant on other projects during previous year.....	9, 556. 18
	14, 194. 18
Received from sales, etc.....	24, 611. 14
Estimated value of materials and supplies on hand (including contract salvage, value of steel sheet piles, and steel forms).....	25, 957. 83
Total.....	4, 248, 156. 03
Outstanding liabilities June 30, 1916.....	145, 379. 85
Total expenditures to June 30, 1916.....	4, 102, 776. 78

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 465).....	\$5, 466, 524. 56
Present project:	
June 25, 1910.....	\$1, 350, 000. 00
Feb. 27, 1911.....	750, 000. 00
Mar. 4, 1913.....	1, 000, 000. 00
Aug. 1, 1914.....	150, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	750, 000. 00
Oct. 2, 1914 (allotted Apr. 12, 1915).....	622, 220. 00
Mar. 3, 1915.....	410, 000. 00
Mar. 4, 1915 (allotted Apr. 1, 1915).....	877, 780. 00
July 27, 1916.....	640, 000. 00
	6, 550, 000. 00
Total of appropriations.....	12, 016, 524. 56
Received from sales, etc.....	24, 611. 14
Grand total	12, 041, 135. 70

CONTRACTS IN FORCE.

TROY LOCK AND DAM.

Steel forms for concrete construction.

Name of contractor: Blaw Steel Construction Co.
Date of contract: February 10, 1913.
Date fixed for commencement: June 1, 1913.
Date fixed for completion: June 1, 1917.
Amount of contract: Item 1, 40 linear feet, 7 by 8 feet, culvert forms; item 2, 80 linear feet, 7 by 9 feet, culvert forms; item 3, 40 linear feet, 2 feet 6 inches by 6 inches, culvert forms; item 4, 4 separate units.
Unit prices: Items 1, 2, and 3, \$2,652.80; item 4, \$12,650.
Completed to June 30, 1916: 100 per cent.
Contract in force until return of used forms.

Steel sheet piling.

Name of contractor: The Carnegie Steel Co.
Date of contract: March 15, 1913.

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Date fixed for commencement: April 15, 1913.
Date fixed for completion: December 31, 1916.
Amount of contract: 1,900 short tons M104 steel sheet piling, 6 short tons tie-rods, etc.
Unit prices: \$35.20 per ton steel sheet piling, \$42.20 per ton tie-rods, etc.
Allowance for returned piling: Condition A, merchantable, \$26; condition B, scrap, \$10.71½.
Completed to June 30, 1916: 100 per cent.
Contract in force until return of used piling.

Furnishing of electric current for Troy Lock and Dam.

Name of contractor: Troy Gas Co.
Date of contract: March 22, 1913.
Date of approval: April 8, 1913.
Date fixed for commencement: April 11, 1913.
Date fixed for completion: December 31, 1917.
Amount of contract: 126,562 kilowatt-hours of electricity up to July 4, 1914; about 1,020,528 kilowatt-hours of electricity July 4, 1914, during balance of life of contract.
Unit prices: 126,562 kilowatt-hours, at 10 cents kilowatt; 1,020,528 kilowatt-hours, at 2 cents kilowatt.
Completed to June 30, 1916: 99 per cent.

Steel forms for concrete construction.

Name of contractor: Blaw Steel Construction Co.
Date of contract: May 5, 1913.
Date fixed for commencement: None.
Date fixed for completion: August 1, 1913.
Amount of contract: Two separate units designed for construction standard 20-foot section of dam.
Unit price: \$5,950 for both.
Completed to June 30, 1916: 100 per cent.
Contract in force until return of used forms.

Furnishing and erecting steel lock gates.

Name of contractor: King Bridge Co.
Date of contract: September 15, 1914.
Date of approval: September 17, 1914.
Date fixed for commencing delivery: 2½ months after September 21, 1914.
Date fixed for completing delivery: 6 months after September 21, 1914.
Date fixed for commencing erection: 2½ months after September 21, 1914, or upon receipt of notification to begin erection from contracting officer.
Date fixed for completing erection: Within 50 fair working days.
Amount of contract: \$21,383.20.
Unit price: Steel, \$0.052 per pound; cast iron, \$0.05 per pound; timber, \$80 per M. feet b. m.
Completed July 27, 1915.

Furnishing cement for Troy Lock and Dam and dikes.

Name of contractor: Alpha Portland Cement Co.
Date of contract: March 20, 1915.
Date fixed for commencement: April 13, 1915.
Date fixed for completion: December 31, 1915.
Amount of contract: 32,000 barrels.
Unit prices: \$1.25 per barrel; \$0.10 rebate for each empty sack to be returned in serviceable or repairable condition. No extra charge for bin storage.
Completed to June 30, 1916: 100 per cent.

Dredging and rock removal.

CONTRACT NO. 3.

Name of contractor: Great Lakes Dredge & Dock Co.
Date of contract: October 20, 1913; supplemental agreement May 25, 1915.

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Date of approval: November 8, 1913; supplemental agreement May 28, 1915.

Date fixed for commencement: January 2, 1914.

Date fixed for completion: June 30, 1916. Channel east of Adams Island at Troy, December 31, 1916.

Amount of contract: 140,000 cubic yards rock, class 1; 22,500 cubic yards rock, class 2; 1,000 cubic yards rock, class 3; 1,500,000 cubic yards other material, class 4; 12,000 meals for inspectors.

Unit prices: Class 1, \$2.40 per cubic yard, place measurement; class 2, \$2.90 per cubic yard, place measurement; class 3, \$2.90 per cubic yard, place measurement; class 4,¹ \$0.43 per cubic yard, scow measurement; meals, \$0.25 each.

Completed to end of June, 1916: 58 per cent.

Dredging.

Name of contractor: Atlantic, Gulf & Pacific Co.

Date of contract: June 5, 1914.

Date of approval: June 10, 1914.

Date fixed for commencement: August 11, 1914.

Date fixed for completion: May 12, 1915.

Amount of contract: 1,800,000 cubic yards.²

Unit price: \$0.089 per cubic yard.

Completed October 5, 1915.

Air compressors.

Name of contractor: C. Philip Coleman, receiver International Steam Pump Co.

Date of contract: March 31, 1916.

Date fixed for commencement: April 14, 1916.

Date fixed for completion: June 29, 1916.

Amount of contract: 2 compressors, 2 atmospheric relief valves, 1 lot of repair parts.

Unit prices: Compressors, \$1,170 each; relief valves, \$20 each; repair parts, \$134.07 for the lot.

Completed to June 30, 1916: None.

Water turbine.

Name of contractor: S. Morgan Smith Co.

Date of contract: March 18, 1916.

Date fixed for commencement: April 2, 1916.

Date fixed for completion: June 2, 1916.

Amount of contract: One vertical-shaft water turbine and fittings; spare parts.

Unit prices: Turbine, \$2,305; spare parts, \$122.

Completed to June 30, 1916: 50 per cent.

Services.

Name of contractor: Thomas M. Newton.

Date of contract: June 22, 1916.

Date fixed for commencement: June 22, 1916.

Date fixed for completion: Indefinite.

Amount of contract: Designing and supervising the erection of lock master's dwelling at Troy Lock.

Unit price: \$400 for the job.

Completed to June 30, 1916: None.

¹In consideration of change in spoil-disposal areas price of class 4 material was reduced to 40.91 cents.

²Also 8,000 meals for inspectors at 25 cents per meal.

COMMERCIAL STATISTICS.

Vessels employed in trade in 1915.

Classes.	Number.	Tonnage.	Greatest length.
			<i>Feet.</i>
Registered steamers.....	27	67-4,400	440
Tugs.....	29	30-345	212
Unregistered barges and canal boats.....	1,800	101-1,200	150

One of the above steamers is licensed to carry 6,000 passengers.
Passengers carried, 907,600.

Freight handled in 1915.

Articles.	Short tons.	Value.
General merchandise and manufactures.....	339,984	\$39,913,509
Building and road materials.....	1,191,082	3,908,250
Metals and metal manufactures.....	81,867	1,860,390
Foodstuffs and farm products.....	835,839	7,103,450
Coal and other fuel.....	722,498	4,875,000
Miscellaneous.....	10,288	1,505,080
Total.....	3,211,739	59,197,000

15. OPERATING AND CARE OF LOCK AND DAM IN HUDSON RIVER AT TROY, N. Y.

This concrete structure was built by the Federal Government to replace wooden crib dam and stone sloop lock operated by the State of New York in connection with its canals located about 1,400 feet downstream.

The Federal lock and dam has been operated and maintained under the permanent indefinite appropriation for operating and care of canals and other works of navigation since August 18, 1915, and the operation was carried on conjointly with the construction work under way on the structure. While the dam was not completed until October 29, 1915, and the State Sloop Lock not closed until March, 1916, the operation of the lock from August 18, 1915, until the State dam was breached was necessary in order to overcome the local difference of head caused by the cofferdams placed for the construction of the closing section of the dam. The open lock was used by traffic from August 2, 1915, to October 17, 1915, when the final closure in the cofferdam increased the discharge from the lock chamber to such an extent as to make navigation without locking hazardous.

The lock proper was completed early in the season of 1915 with the exception of the upper guide wall and installation of the regular lock-operating machinery, the placing of which was necessarily postponed until the season of 1916. As shown in the report covering the project for improving Hudson River, N. Y., contracts were entered into for the major part of the lock-operating machinery during the fiscal year 1916, but the ultimate completion of the installation of this machinery will probably extend until the spring of 1917. It is expected, however, that with the opening of navigation for the season of 1917, the regular lock-operating machinery will be in place and

ready for operation. Until the permanent operating machinery has been installed the gates and valves are operated by means of wire cables connected with two hoisting engines placed one on each wall at the upper end of the lock.

A regular crew for the operation of the lock was not organized until April 1, 1916. During the navigation season of 1915 the lock was operated by engineman, lockmen, and laborers, whose services were utilized on the construction whenever not needed in the operation of the lock. The permanent crew organized April 1, 1916, was similarly employed.

General repairs effected during the fiscal year consisted of thoroughly cleaning the steel gates by means of sand blasting and painting them one coat of red lead and oil and one coat of asphaltum varnish.

The total expenditures during the year were as follows:

Salaries of temporary crew for operation of lock Aug. 1, 1915, to Dec. 12, 1915.....	\$2, 428. 95
Salaries of permanent personnel from Apr. 1, 1916, to July 1, 1916....	3, 236. 02
Cost of operating supplies, electricity for lighting, etc.....	800. 00
Total.....	6, 464. 97

COMMERCIAL STATISTICS.

The lock was operated from August 18, 1915, to December 12, 1915, when navigation was suspended, due to winter conditions. Navigation for the season of 1916 was resumed May 8, 1916. The following is a list of lockages made and vessels passed through the lock during the fiscal year:

Number of lockages.....	1, 609
Total number of vessels:	
Ascended.....	2, 287
Descended.....	2, 314
	4, 601
Vessel classification:	
Towboats.....	1, 399
Freight steamers.....	15
Canal boats, barges, self-propelled or otherwise.....	3, 005
Motor boats, dredges, and miscellaneous craft.....	182
	4, 601

The following table shows the record of freight carried through the lock during the period August 2, 1915, to the end of the fiscal year:

Commodity.	Short tons.	Value.
Building and road materials.....	152, 630	\$763, 100
Metals and metal manufactures.....	65, 406	2, 616, 240
Foodstuffs and farm products.....	81, 851	4, 911, 060
General merc.andise.....	10, 419	1, 041, 900
Miscellaneous.....	198, 455	992, 275
Total.....	508, 751	10, 324, 575

16. SAUGERTIES HARBOR, N. Y.

No operations during the fiscal year. Funds on hand were not sufficient to undertake the work necessary.

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 8d sess., p. 557)-----	\$57,000.00
Present project:	
June 13, 1902-----	\$20,000.00
June 13, 1902 (allotted May 31, 1904)-----	3,000.00
Mar. 3, 1905-----	5,000.00
Mar. 2, 1907-----	20,000.00
June 25, 1910-----	12,500.00
July 25, 1912-----	2,500.00
Mar. 4, 1913-----	2,500.00
July 27, 1916-----	11,250.00
	<hr/> 76,750.00
Total of appropriations-----	133,750.00
Received from sales, etc-----	5.65
	<hr/>
Grand total-----	133,755.65

COMMERCIAL STATISTICS.

Vessels employed in trade in 1915.

Classes.	Number.	Tonnage.	Draft.
Passenger and freight.....	2	580-593	<i>Foot.</i> 6-9
Barges and canal boats.....	25	95-650	4-11
Tugs.....	3	30-85	8-9

Passengers carried, 20,000.

Freight handled in 1915.

Articles.	Short tons.	Value.
General merchandise.....	2,053	\$529,950
Coal.....	35,000	144,000
Manufactures.....	13,000	1,300,000
Metals and metal manufactures.....	1,000	65,000
Foodstuffs and farm products.....	3,555	184,390
Building and road materials.....	35,250	48,300
Miscellaneous.....	900	7,900
Total.....	<hr/> 94,758	<hr/> 2,279,550

17. HARBORS AT RONDOUT AND PEEKSKILL, N. Y.

(A) RONDOUT HARBOR.

No operations during the fiscal year.

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APPROPRIATIONS.

June 10, 1872	\$10,000.00
Mar. 3, 1873	20,000.00
June 8, 1875 (allotments)	1,000.00
Aug. 14, 1876	30,000.00
June 15, 1878	30,000.00
Aug. 2, 1882	2,000.00
July 5, 1884	1,000.00
Aug. 5, 1886	2,500.00
Aug. 11, 1888	5,000.00
Sept. 19, 1890	5,000.00
July 13, 1892	5,000.00
Aug. 18, 1894	5,000.00
June 3, 1896	2,500.00
June 13, 1902 (allotted July 2, 1902)	2,500.00
June 13, 1902 (allotted June 9, 1904)	3,800.00
Mar. 3, 1905 (allotted May 11, 1905)	15,000.00
Mar. 2, 1907 (allotted Mar. 29, 1907)	3,000.00
June 25, 1910 (allotted July 30, 1910)	1,500.00
Feb. 27, 1911 (allotted Mar. 31, 1911)	4,000.00
July 25, 1912	11,000.00
Mar. 4, 1913	5,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	3,000.00
July 27, 1916	4,250.00
Total of appropriations	172,050.00
Received from sales	5.25
Grand total	172,055.25

COMMERCIAL STATISTICS.

Vessels employed in trade in 1915.

Classes.	Number.	Tonnage.	Draft.
			<i>Fms.</i>
Passenger	6	570-2,011	5.5-14
Tugs	15	30-435	6-14
Canal boats and barges	125	95-880	5-12

Passengers carried, about 38,068.

Freight handled in 1915.

Articles	Short tons.	Value.
General merchandise	24,219	\$242,190
Coal and other fuel	218,000	1,080,000
Lumber	30,000	600,000
Building and road material	48,700	243,500
Fruit and farm products	3,600	145,000
Ice	45,000	90,000
Asbes, etc.	1,600	1,500
Total	369,019	2,402,190

* Allotments of \$762.18 from appropriation for repairs of harbors on Atlantic coast, and of \$237.82 from contingencies of rivers and harbors, etc., made June, 1875. Date of acts not known.

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(B) PEEKSKILL HARBOR, N. Y.

There were no operations during the fiscal year. A rough examination shows that the dredged channel has shoaled about 1 foot throughout practically its whole length.

APPROPRIATIONS.

June 3, 1896.....	\$10,000.00
Mar. 3, 1899.....	10,000.00
June 18, 1902 (allotted July 2, 1902).....	3,000.00
Mar. 3, 1905 (allotted May 11, 1905).....	2,500.00
Mar. 2, 1907 (allotted Mar. 29, 1907).....	3,000.00
June 25, 1910 (allotted July 30, 1910).....	1,500.00
Feb. 27, 1911 (allotted Mar. 31, 1911).....	2,000.00
July 27, 1916.....	1,000.00
Total of appropriations.....	33,000.00
Received from sales, etc.....	2.60
Grand total.....	33,002.60

COMMERCIAL STATISTICS.

Season of navigation opened April 1, 1915, and closed December 25, 1915.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).		Passengers carried.
	American.	Foreign.	Arrivals.	Departures.	Least.	Greatest.	Least.	Greatest.	
Registered:									
Steamers.....	7	.....	679	679	34	916	4	10	15,137
Towboats.....	2	.....	132	132	34	49	7	8	.....
Canal boats, lighters, barges, etc.....	198	.....	198	198	200	500	6	9	.....
Miscellaneous craft.....	2	.....	850	850	1	3	2	3	7,280

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick (building).....	3,300,000 brick.....	6,600	\$19,800
Brick (hollow tile).....	40,000 brick.....	400	200
Brick (fire).....	5 short tons.....	5	86
Cement.....	13,280 barrels.....	2,652	19,784
Lime.....	290 barrels.....	35	434
Sand.....	1,050 cubic yards.....	14,000	600
Crushed stone.....	1,200 cubic yards.....	1,800	960
Flagging.....	50 short tons.....	50	1,500
Paving blocks (asphalt).....	235,000 bloc s.....	1,762	3,525
Lumber and timber (sawed).....	1,704,075 feet b. m.....	2,556	77,215
Laths.....	10,270 bundles.....	128	3,075
Sewer pipe.....	79 short tons.....	79	1,461
Agricultural implements.....	200 short tons.....	200	6,000
Engines and machinery.....	1,000 short tons.....	1,000	300,000
Copper (sheet, bar, etc.).....	510 short tons.....	510	152,000
Iron ore.....	2,500 short tons.....	2,500	12,000
Iron (pig and scrap).....	1,125 short tons.....	1,125	10,000
Cast-iron manufactures.....	7,345 short tons.....	7,345	734,500
Steel (ingot, sheet, bar, etc.).....	440 short tons.....	440	17,600
Steel manufactures.....	3,550 short tons.....	3,550	275,000

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Freight handled in 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Structural steel.....	65 short tons.....	65	\$3,260
Wire (iron or steel).....	20 short tons.....	20	2,000
Lead manufactures.....	210 short tons.....	210	30,240
Pipe (steel).....	325 short tons.....	325	16,250
Fruits.....	5,842 barrels.....	730	44,630
Vegetables.....	10,340 barrels.....	775	24,025
Flour.....	820 barrels.....	88	5,424
Grain.....	2,240 short tons.....	2,240	134,400
Hay.....	40 short tons.....	40	1,520
Straw.....	21 short tons.....	21	4,746
Salt.....	48 short tons.....	48	4,480
Sugar.....	4,750 short tons.....	4,750	475,000
Fish.....	445 short tons.....	445	223
Oysters and clams.....	274 barrels.....	34	1,607
Horses.....	385 horses.....	231	96,250
Poultry.....	320 barrels.....	23	15,200
Beer and ale.....	950 barrels.....	190	5,700
Wine.....	215 barrels.....	53	86,000
Alcohol and products.....	50 barrels.....	10	2,500
Dry goods.....	175 short tons.....	175	80,000
Clothing and woollens.....	60 short tons.....	60	60,000
Cotton goods.....	1,350 short tons.....	1,350	235,000
Glassware.....	20 short tons.....	20	1,400
Pianos.....	41 pianos.....	17	14,145
Rubber goods.....	5 short tons.....	5	5,675
Leather goods.....	6 short tons.....	6	276
Drugs and chemicals.....	4 short tons.....	4	234
Rope.....	22 short tons.....	22	6,600
Hardware.....	27 short tons.....	27	4,725
General merchandise.....	1,463 short tons.....	1,463	166,800
Coal.....	50,000 long tons.....	56,000	215,500
Oil.....	7,030 long tons.....	7,873	21,786
Hides.....	30 short tons.....	30	12,000
Clay.....	1,320 short tons.....	1,320	3,960
Molding sand.....	1,000 short tons.....	1,000	780
Tobacco.....	20 short tons.....	20	16,000
Oil (lubricating).....	715 gallons.....	3	357
Oil (essential).....	206,461 gallons.....	24,775	6,986
Gasoline.....	250 gallons.....	1	2,500
Fertilizer (chemical).....	215 short tons.....	215	27,090
Vinegar.....	6,000 barrels.....	1,200	30,000
Yeast.....	388,000 pounds.....	194	90,000
Total.....		152,854	\$3,777,619

18. WAPPINGER CREEK, N. Y.

There were no operations during the year. An examination of the dredged channel was made in November, 1915, by sounding. The results showed shoaling of from 1 to 2 feet in the areas dredged in 1914, the greatest shoaling having occurred adjacent to side slopes.

APPROPRIATIONS.

Sept. 19, 1890.....	\$18,000.00
June 13, 1902.....	1,500.00
Mar. 3, 1905.....	3,000.00
Mar. 2, 1907.....	3,000.00
June 25, 1910.....	5,000.00
Mar. 4, 1913.....	3,500.00
July 27, 1916.....	3,500.00
Total of appropriations.....	32,500.00
Received from sales, etc.....	5.43
Grand total.....	32,505.43

COMMERCIAL STATISTICS.

Season of navigation opened April 1, 1915, and closed December 25, 1915.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).		Passengers carried.
	Ameri-can.	For-eign.	Arriv-als.	Depart-ures.	Least.	Great-est.	Least.	Great-est.	
Registered:									
Steamers.....	2	.....	433	433	49	160	6	8	21,763
Towboats.....	3	.....	480	480	21	29	4	6	.....
Canal boats, lighters, barges, etc.....	86	.....	86	86	200	500	6	9	.....
Unregistered miscellaneous craft ¹	5	.....	956	956	40	40	3	3	.....

¹ Carrying capacity tonnage.*Freight handled in 1915.*

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick (building).....	150,000 brick.....	300	8900
Cement.....	4,925 barrels.....	985	7,887
Lime.....	500 barrels.....	62	625
Sand.....	900 cubic yards.....	1,200	450
Crushed stone.....	266 cubic yards.....	369	234
Lumber and timber (sawed).....	2,311,520 feet b. m.....	3,466	49,549
Shingles.....	475 bundles.....	19	2,375
Lath.....	500 bundles.....	6	200
Copper manufactures.....	4 short tons.....	4	985
Iron (sheet, bar, etc.).....	2 short tons.....	2	190
Cast-iron manufactures.....	28 short tons.....	28	1,247
Pipe (wrought iron).....	5 short tons.....	5	150
Pipe (steel).....	.....do.....	5	100
Fruits.....	400 barrels.....	50	2,650
Vegetables.....	450 barrels.....	45	1,250
Flour.....	1,100 barrels.....	119	8,250
Grain.....	700 bags.....	21	777
Hay.....	80 short tons.....	80	1,690
Straw.....	90 short tons.....	90	1,336
Salt.....	45 short tons.....	45	900
Sugar.....	150 short tons.....	150	12,500
Fish.....	10 short tons.....	10	300
Oysters and clams.....	8 barrels.....	1	26
Ice.....	25 short tons.....	25	54
Beer and ale.....	400 barrels.....	100	3,700
Alcohol and products.....	80 barrels.....	16	4,000
Clothing and woolens.....	100 short tons.....	100	10,000
Cotton goods.....	8,283 short tons.....	8,283	4,743,200
Drugs and chemicals.....	2,935 short tons.....	2,935	192,508
Clay manufactures.....	20 short tons.....	20	300
Hardware.....	15 short tons.....	15	2,625
General merchandise.....	2,196 short tons.....	2,196	130,388
Coal.....	19,167 long tons.....	21,467	67,327
Asbes.....	1,538 cubic yards.....	1,046	154
Total.....		43,315	5,260,428

19. TARRYTOWN HARBOR, N. Y.

Proposals for dredging invited by advertisement dated May 2, 1916, were opened June 1, 1916. But one bid was received, for 39.8 cents per cubic yard, scow measurement; it was rejected as excessive.

Soundings taken in November, 1915, showed shoaling of from 1 to 3 feet, the heavier shoaling having occurred adjacent to side slopes.

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APPROPRIATIONS.

Mar. 3, 1905	\$10,000.00
Mar. 2, 1907	16,000.00
June 25, 1910	10,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	3,000.00
July 27, 1916	10,000.00
Total of appropriations	49,000.00
Received from sales	11.95
Grand total	49,011.95

COMMERCIAL STATISTICS.

Season of navigation opened April 1, 1915, and closed December 25, 1915.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).		Passengers carried.
	Ameri-can.	For-aign.	Arriv-als.	Depart-ures.	Least.	Great-est.	Least.	Great-est.	
Registered:									
Steamers	6		5,722	5,722	90	900	5	10	122,639
Towboats	27		116	116	34	124	7	10	
Canal boats, lighters, barges, etc.	38		49	49	200	600	6	10	
Unregistered:									
Canal boats, lighters, barges, etc. ¹	78		124	124	67	650	5	10	
Miscellaneous craft ¹	1		3	3		66		6	

¹ Carrying capacity tonnage.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick (building)	2,000,000 brick	4,000	\$13,000
Brick (hollow tile)	38,000 brick	475	3,800
Brick (fire)	6 short tons	6	180
Building stone	1,000 short tons	1,000	6,370
Cement	26,450 barrels	5,280	45,044
Gravel	5,654 cubic yards	7,539	4,242
Sand	8,555 cubic yards	11,407	3,691
Crushed stone	10,890 cubic yards	16,335	8,806
Flagging	224 short tons	224	2,963
Paving blocks (asphalt)	250,000 blocks	2,500	9,500
Lumber and timber (sawed)	180,431 feet b. m.	271	4,661
General merchandise	13,000 short tons	13,000	1,300,000
Coal	31,812 long tons	35,405	176,127
Cord wood	100 cords	180	650
Ashes	1,851 cubic yards	1,259	274
Petroleum products	920,914 gallons	3,360	58,043
Total		102,251	1,637,341

20. HUDSON RIVER CHANNEL, NEW YORK HARBOR.

Dredging under contract with the Coastwise Dredging Co., in progress on June 30, 1915, was completed April 6, 1916. There were removed thereunder during the year 644,270.1 cubic yards, scow

measurement, of material from the Weehawken-Edgewater water front, at a cost of \$95,131.18, and 190,448.3 cubic yards of material from the shoal in the Hoboken water front, at a cost of \$28,307.86. This latter work was done under supplemental contract.

Dredging under contract with Morris & Cumings Dredging Co., in progress June 30, 1915, was completed December 6, 1915. There were removed thereunder during the year 644,706.3 cubic yards, scow measurement of river silt and 2.22 cubic yards, solid measurement, of small bowlders from the Jersey City water front, at a cost of \$71,644.72.

There was also paid from the appropriation for this work a proportional part of the cost of constructing the storehouses and boat shed and of the motor launch reported upon in the report on East River and Hell Gate. (See p. 1965, this report.)

APPROPRIATIONS.

Previous projects:		
Mar. 3, 1875.....	\$25,000.00	
July 1, 1902 (joint resolution—allotment).....	25,000.00	
Mar. 3, 1905 (allotment).....	18,979.12	
		\$68,979.12
Existing project:		
Mar. 4, 1913.....	\$200,000.00	
Aug. 1, 1914.....	150,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914).....	125,000.00	
Mar. 3, 1915.....	100,000.00	
July 27, 1916.....	450,000.00	
		1,025,000.00
Total existing project.....		1,025,000.00
Total of appropriations.....		1,083,979.12
Received from sales and collections, existing project.....		116.87
Total.....		1,084,095.99

CONTRACTS IN FORCE.

Contractor: Coastwise Dredging Co.

Date of contract: March 23, 1914.

Date of approval, March 28, 1914.

Date fixed for commencement: May 2, 1914.

Date fixed for completion: May 2, 1916.

Amount of contract: 1,900,000 cubic yards (exclusive of allowable overdepth) of dredging; 50 cubic yards of bowlders $\frac{1}{2}$ to 3 cubic yards in size; 25 cubic yards of bowlders over 3 cubic yards in size. Dredging to be scow measurement and bowlders to be solid measurement.

Unit prices: Dredging, \$0.143 per cubic yard; bowlders $\frac{1}{2}$ to 3 cubic yards in size, \$6 per cubic yard; bowlders over 3 cubic yards in size, \$10 per cubic yard.

Supplemental contract, entered into September 10, 1915, provides for not exceeding \$32,000 worth of work in the Hoboken water front at a unit price for dredging of 13.8 cents per cubic yard, scow measurement, in lieu of an amount of equal value in other areas specified in the contract dated March 23, 1914, and extends the time for completing the work to June 2, 1916.

Completed April 6, 1916.

Contractor: Morris & Cumings Dredging Co.

Date of contract, February 8, 1915.

Date of approval: February 12, 1915.

Date fixed for commencement: March 16, 1915.

Date fixed for completion: December 15, 1915.

* Diverted from appropriation for Ambrose Channel, New York Harbor.

* Original amount, \$20,000, of which \$1,020.88 was retransferred to Ambrose Channel.

RIVERS AND HARBORS—FIRST NEW YORK, N. Y., DISTRICT. 1995

Amount of contract: 600,000 cubic yards (exclusive of allowable overdepth) of dredging; 50 cubic yards bowlders $\frac{1}{2}$ to 3 cubic yards in size; 25 cubic yards of bowlders over 3 cubic yards in size. Dredging to be scow measurement and bowlders to be solid measurement.

Unit prices: Dredging, \$0.1083 per cubic yard; bowlders $\frac{1}{2}$ to 3 cubic yards in size, \$6 per cubic yard; bowlders over 3 cubic yards in size, \$10 per cubic yard. Completed December 6, 1915.

COMMERCIAL STATISTICS.

Season of navigation continuous.

Vessels employed in trade in 1915.

Class.	Number of vessels.		Total number.		Tonnage of vessels.		Draft (feet).		Passengers carried.
	Ameri-can.	For-eign.	Arriv-als.	Depart-ures.	Least.	Great-est.	Least.	Great-est.	
Registered:									
Steamers.....	674	433	591,714	591,702	37	12,611	4	36	69,239,418
Towboats.....	211		55,348	55,348	14	120	6	17	
Sailing vessels.....	78		279	279	60	1,333	14	23	
Canal boats, lighters, barges, etc.....	3,250		87,046	87,046	50	2,300	2	16	
Miscellaneous craft.....	1,782		2,268	2,268	30	10,000	4	13	
Naval vessels.....	139		142	142	105	27,500	4	20	
Unregistered:									
Sailing vessels.....	43		1,007	1,007	150	900	10	21	
Canal boats, lighters, barges, etc.....	16,263		51,325	50,813	150	2,000	2	14	

¹ Carrying capacity tonnage.

² Displacement tonnage.

Freight handled in 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt.....	22,509 short tons.....	22,509	\$242,143
Brick (building).....	762,674 M brick.....	1,525,348	4,576,044
Brick (hollow tile).....	51,138 short tons.....	51,138	267,553
Brick (fire).....	6,514 M brick.....	19,724	269,074
Marble.....	8,100 short tons.....	8,100	244,150
Building stone.....	31,091 short tons.....	31,091	244,908
Cement.....	4,452,747 barrels.....	890,549	6,945,967
Lime.....	334,121 barrels.....	41,765	334,120
Gravel.....	216,150 cubic yards.....	270,187	181,889
Sand.....	691,222 cubic yards.....	739,031	260,503
Crushed stone.....	3,030,549 cubic yards.....	4,545,823	2,411,573
Riprap.....	9,900 cubic yards.....	14,700	9,200
Flagging.....	14,286 short tons.....	14,286	103,401
Paving blocks (asphalt).....	15,373,000 blocks.....	115,298	345,894
Paving blocks (stone).....	414,800 blocks.....	5,185	26,490
Lumber and timber (sawed).....	209,933,996 feet b. m.....	314,899	5,595,370
Lath.....	278,007 bundles.....	3,482	104,800
Piles or logs.....	457,127 linear feet.....	6,260	88,870
Ties.....	1,387,845.....	132,176	1,112,042
Sewer pipe.....	1,093 short tons.....	1,093	11,524
Agricultural implements.....	3,562 short tons.....	3,562	353,150
Engines and machinery.....	88,862 short tons.....	88,862	18,304,747
Aluminum (shell, bar, ingot).....	1,036 short tons.....	1,036	207,200
Aluminum manufactures.....	75 short tons.....	75	37,500
Copper ore.....	2,175 short tons.....	2,175	609,000
Copper (sheet, bar, wire, etc.).....	95,822 short tons.....	95,822	29,123,800
Copper ingot.....	345,903 short tons.....	345,903	103,770,900
Copper manufactures.....	50,391 short tons.....	50,391	17,629,300
Iron ore.....	59,964 short tons.....	59,964	302,590
Iron (pig, scrap).....	97,648 short tons.....	97,648	1,420,334
Iron (sheet, bar, etc.).....	29,992 short tons.....	29,992	1,632,601
Iron oxide.....	43,341 short tons.....	43,341	86,682
Cast-iron manufactures.....	65,218 short tons.....	65,218	3,918,820
Steel (ingot).....	81,309 short tons.....	81,309	3,151,032
Steel manufactures.....	175,747 short tons.....	175,747	12,043,535
Structural steel.....	96,827 short tons.....	96,827	4,744,220

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Freight handled in 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Wire (iron, steel).....	101,651 short tons.....	101,651	\$9,222,980
Lead (sheet, bar, ingot).....	79,935 short tons.....	79,935	9,044,541
Lead manufactures.....	2,850 short tons.....	2,850	324,540
Other metals (sheet, bar, etc.).....	165,040 short tons.....	165,040	14,314,089
Other metal manufactures.....	112,048 short tons.....	112,048	5,588,440
Pipe (wrought iron).....	22,149 short tons.....	22,149	906,130
Pipe (cast iron).....	4,484 short tons.....	4,484	183,370
Pipe (steel).....	340 short tons.....	340	17,000
Fruit.....	382,526 barrels.....	47,816	2,989,031
Vegetables.....	1,097,891 barrels.....	81,325	2,533,365
Flour.....	3,048,618 barrels.....	338,735	22,095,497
Grain.....	2,060,657 short tons.....	2,060,657	83,626,280
Hay.....	55,632 short tons.....	55,632	1,112,640
Straw.....	2,135 short tons.....	2,135	32,025
Salt.....	11,917 short tons.....	11,917	120,080
Sugar.....	1,743,016 short tons.....	1,743,016	157,529,217
Fish.....	9,731 short tons.....	9,731	414,600
Oysters and clams.....	6,324 barrels.....	791	30,065
Ice.....	497,231 short tons.....	497,231	945,132
Horses.....	146,273 horses.....	91,421	25,223,020
Cattle.....	561,194 cattle.....	280,597	48,529,619
Sheep.....	1,453,557 sheep.....	96,904	26,164,026
Hogs.....	440,927 hogs.....	88,185	5,405,482
Poultry.....	5,520 short tons.....	5,520	2,026,880
Beer and ale.....	20,001 barrels.....	5,001	158,512
Wine.....	60,950 gallons.....	243	800,000
Alcohol and products.....	31,433 barrels.....	5,239	94,025
Dry goods.....	11,878 short tons.....	11,878	2,735,200
Clothing and woolens.....	220 short tons.....	220	28,650
Cotton goods.....	7,557 short tons.....	7,557	3,956,000
Glassware.....	15,299 short tons.....	15,299	415,525
Pianos.....	562 pianos.....	235	193,600
Rubber goods.....	6,588 short tons.....	6,588	7,473,491
Leather goods.....	5,258 short tons.....	5,258	1,840,300
Drugs and chemicals.....	300,639 short tons.....	300,639	18,469,587
Clay manufactures.....	4,916 short tons.....	4,916	77,009
Rope.....	9,992 short tons.....	9,992	3,144,626
Hardware.....	4,935 short tons.....	4,935	870,678
General and miscellaneous.....	23,516,788 short tons.....	23,516,788	5,442,784,960
Coal.....	16,474,238 long tons.....	18,461,142	71,737,623
Coke.....	16,583 short tons.....	16,583	69,885
Cordwood.....	6,560 cords.....	3,644	45,600
Asbes.....	3,666,431 cubic yards.....	2,749,824	364,385
Garbage.....	81,196 short tons.....	81,196	14,775
Cellar dirt.....	453,510 cubic yards.....	604,680	96,055
Wool (raw).....	50,482 short tons.....	50,482	15,144,000
Cotton (raw).....	509,669 short tons.....	509,669	98,622,380
Hides.....	28,933 short tons.....	28,933	12,866,100
Leather.....	2,667 short tons.....	2,667	2,037,800
Dyewoods.....	10,615 short tons.....	10,615	639,900
Wood pulp.....	12,500 short tons.....	12,500	156,000
Clay.....	45,367 short tons.....	45,367	448,707
Molding sand.....	123,556 short tons.....	123,556	126,186
Tobacco.....	16,949 short tons.....	16,949	16,665,100
Oil (lubricating).....	30,495,856 gallons.....	121,933	5,489,112
Oil (essential).....	48,598,610 gallons.....	194,390	17,189,494
Gasoline.....	9,091,960 gallons.....	33,182	933,865
Kerosene.....	3,372,092 gallons.....	12,307	199,027
Turpentine.....	367,050 gallons.....	1,468	251,937
Other petroleum products.....	19,918,101 gallons.....	72,693	2,145,886
Coal tar.....	100 short tons.....	100	2,000
Fertilizer (chemical).....	19,765 short tons.....	19,765	2,490,515
Manure.....	51,476 short tons.....	51,476	54,344
Chalk and whiting.....	20,149 short tons.....	20,149	135,580
Sulphur.....	7,220 short tons.....	7,220	170,200
Ammunition and ordnance.....	8,832 short tons.....	8,832	6,340,900
Bagging.....	72,765 short tons.....	72,765	13,004,530
Coffee, tea, cocoa.....	9,601 short tons.....	9,601	2,328,500
Cooperage.....	65,545 short tons.....	65,545	3,494,500
Bananas.....	11,430 short tons.....	14,430	144,300
Flaxseed.....	79,947 short tons.....	79,947	4,543,918
Molasses.....	46,871 barrels.....	9,208	374,970
Mortar.....	2,140 short tons.....	2,140	9,994
Oleostearin, etc.....	79,563,305 pounds.....	39,782	4,737,165
Pitch.....	37,917 short tons.....	37,917	1,775,445
Plaster.....	54,465 short tons.....	54,465	366,264
Rooin.....	4,007 short tons.....	4,007	1,158,961
Rubber.....	1,288 short tons.....	1,288	1,288,000
Total.....		63,458,291	6,410,144,119

RIVERS AND HARBOURS—FIRST NEW YORK, N. Y., DISTRICT. 1997

The above figures may be classified as follows:

	Short tons.	Value.
Traffic on Manhattan side.....	22,412,946	\$1,918,017,925
Traffic on New Jersey side.....	22,218,684	3,235,690,873
Through traffic in both directions.....	3,887,718	31,556,931
Miscellaneous traffic at either or both sides.....	14,938,943	1,224,878,390
Total.....	63,458,291	6,410,144,119

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IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND NEW YORK, N. Y., DISTRICT.

REPORT OF COL. FREDERIC V. ABBOT, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. New York Harbor: Ambrose, Main Ship, Bayside, and Gedney Channels.....	1999	6. Wallabout Channel, N. Y.....	2008
2. New York Harbor: Coney Island Channel.....	2003	7. Newtown Creek, N. Y.....	2009
3. New York Harbor: Bay Ridge and Red Hook Channels.....	2003	8. Jamaica Bay, N. Y.....	2010
4. New York Harbor: Gowanus Creek Channel.....	2005	9. Sheepshead Bay, N. Y.....	2012
5. New York Harbor: Collection of drift.....	2007	10. Harbors at Port Jefferson, Matituck, Huntington, and Flushing Bay, N. Y.....	2012
		11. Hempstead Harbor, N. Y.....	2017
		12. Great South Bay, N. Y.....	2018
		13. Browns Creek, N. Y.....	2020

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 261 TO 303.

1. NEW YORK HARBOR: AMBROSE, MAIN SHIP, BAYSIDE, AND GEDNEY CHANNELS.

No dredging was done. The entrance channels have been completed and no excavation for maintenance was needed during the year.

The dredge *Raritan* was leased to the Gowanus Bay improvement until January 22, when she was returned and tied up at the New York Navy Yard. A new pump specially designed for this dredge was purchased and delivered February 3. Tests were made of this pump, both as to water capacity and as to dredging efficiency, with the previous 20-inch suction line and with a new 24-inch suction line. They showed a decided increase in pumping efficiency, and in excavation as well, especially with the 24-inch suction line. On account of a strike among firemen and stokers in New York Harbor the dredging tests were suspended before they were quite completed, and most of the crew were transferred to the *Atlantic* in May.

The dredge *Atlantic* was leased to the Gowanus Bay improvement until January 16, when, on account of exhaustion of funds, she was returned and tied up at the New York Navy Yard. She was leased to the Jamaica Bay improvement on May 24 and continued there until the close of the fiscal year, dredging in the entrance channel.

The dredge *Navesink* was leased to the Newport (R. I.) district from July 1 until February, 1916, when she was turned back, and, as a matter of economy, was laid up at New Bedford, Mass.

Examinations of several parts of the shoals and banks in the lower bay at the harbor entrance were made to determine the movements of the shoals since the survey of 1897.

Complaint was received of shoaling in Main Ship and Gedney Channels such as to make passage difficult for a vessel of 26 feet draft. Examination of the localities reported has been begun. So far nothing has been found to justify the complaint. The channels at the points examined are in as good condition as usual and are easily navigable by boats up to 30 feet draft.

Collection and removal of drift under authority of the river and harbor act of 1915 have been continued largely at the expense of these appropriations. Details are given in report on collection and removal of drift.

All of the above work is chargeable as maintenance.

APPROPRIATIONS.

Applications.	Date.	Amount.
For Gedney and Main Ship Channels and maintenance, prior to Dec. 31, 1902 (as per H. Doc. No. 1491, 63d Cong., 3d sess., p. 508).....		\$2,061,530.00
For maintenance, allotted—		
Sept. 2, 1903, from emergency appropriation.....	June 6, 1900	1,500.00
May 31, 1904, from general appropriation for repair and maintenance...	Apr. 28, 1904	15,000.00
Jan. 26, 1905, from general appropriation for repair and maintenance.....	Mar. do.	15,000.00
For maintenance.....	Mar. 3, 1905	75,000.00
Do.....	Mar. 2, 1907	125,000.00
Do.....	Mar. 3, 1909	100,000.00
For maintenance, including Ambrose Channel.....	June 25, 1910	200,000.00
	Feb. 27, 1911	100,000.00
	July 25, 1912	200,000.00
	Mar. 4, 1913	200,000.00
	July 27, 1916	40,000.00
Total of appropriations.....		3,133,030.00
Amount withdrawn and allotted elsewhere (act of Mar. 4, 1915).....		300,000.00
Net total.....		3,833,030.00
Received from other sources.....		44,249.24
Grand total.....		3,877,279.24
For East (Ambrose) Channel dredging.....	Mar. 3, 1899	1,000,000.00
	Mar. 3, 1901	130,000.00
	June 25, 1902	125,000.00
	Mar. 3, 1903	733,000.00
	Apr. 29, 1904	60,000.00
	Mar. 3, 1905	696,530.88
	June 30, 1906	265,000.00
	Mar. 4, 1907	470,000.00
	May 27, 1908	683,490.00
	Mar. 4, 1909	627,000.00
	June 25, 1910	324,510.00
Total of appropriations.....		5,104,530.88
Amount withdrawn and allotted elsewhere (act of Mar. 4, 1915).....		180,000.00
Net total.....		4,924,530.88
Received from other sources.....		608,531.45
Grand total.....		5,533,062.33

¹ Includes \$115,000 for removal of wreck and \$1,530 for removal of rock.

² Appropriation \$150,000, of which \$25,000 was diverted to removal of rock off Pier A.

³ Appropriation \$715,510, of which \$18,979.12 was diverted to removal of rock off Pier A.

COMMERCIAL STATISTICS.

No comprehensive record of the commerce of the port of New York is kept, and its magnitude and diversity preclude the possibility of preparing such for this report. The Chamber of Commerce of the State of New York in its annual report prepares with care a statement of imports from and exports to foreign

RIVERS AND HARBORS—SECOND NEW YORK, N. Y., DISTRICT. 2001

countries, but not including domestic, coastwise, and local traffic. This is the most accurate statement available for the items which it covers, and from the report for the year ending June 30, 1915, just published, the following data are compiled:

The leading articles of import into the United States at the port of New York for the year ending June 30, 1915, were sugar, tea, coffee, wool, cloths and dress goods, hides, leather and leather goods, furs, copper, tin, rubber, cocoa, fibers, and tobacco, which with other miscellaneous imports aggregated about 6,209,870 short tons, valued at \$975,857,421. The value of such imports for all other ports of the United States for the same period was \$898,991,897. The leading articles of export were cotton, breadstuffs, meats and other provisions, oils, tobacco, metals, machinery, and manufactures, which, with other items, amounted to about 11,676,023 short tons, valued at \$1,240,480,097. The value of such exports for all other ports of the United States for the same period was \$1,664,905,461. Vessels trading with domestic ports are not required to take out clearance papers, and most of them do not; no statistics of their carrying trade are accessible.

Foreign commerce, port of New York, year ending June 30, 1915.

DETAILS OF ITEMS OF LARGEST TONNAGE.

[From chamber of commerce report.]

Imports.			Item.	Exports.		
Percentages of value.	Value.	Short tons.		Short tons.	Value.	Percentages of value.
Corn, 42; macaroni, 2; sage and tapioca, 13; rice, 11.	\$8,184,609	157,027	Breadstuffs....	2,172,085	\$140,858,444	Wheat and wheat flour, 79; corn, 7; oats, 5.
	32,870	4,646	Cement, hydraulic.	434,720	2,901,089	
Alkane dyes, 20; tanning extract, 13; gums—camphor, chicle, copal, etc., 20.	26,394,502	154,349	Chemicals.....	188,838	20,217,745	Patent medicines, 19; acids, 6.
	32,272	10,272	Coal.....	239,079	1,178,522	Anthracite, 88; bituminous, 12; coke, 5.
Crude, 99; prepared, 1.	22,541,940	98,946	Cocoa and chocolate.	3,800	1,683,400	Manufactured, not including confectionery.
Pigs, ingots, and bars, 71; ores, 19.	72,042,844	379,080	Coffee.....	858	260,244	Pigs, ingots, and bars, 85.
Leaves, 26; embroideries, 17; cloth, 10; knit goods, 8.	20,623,877	183,874	Copper.....	270,560	78,547,786	Baled, 30; cloth, 32; wearing apparel, 30.
Flax, 25; jute, 23; manila, 19; flax, 10.	39,158,356	22,478	Cotton.....	197,526	71,015,122	Manufactured: Twine, 37; bags, 21.
Bananas, 29; lemons, 25; grapes, 10; olives, 9; figs, 7.	10,884,706	107,627	Fibers.....	36,516	6,146,282	Apples, 35; dried apples, 22; prunes, 10; pears, 5.
Cattle, 66; sheep, 7; calves, 2.	14,072,409	150,317	Fruits.....	205,139	12,829,280	Cattle, 77.
Unmanufactured gums, 99.	64,634,916	162,845	Hides and skins, uncured.	1,326	471,581	
Ore, 100.....	82,122,751	93,196	India rubber..	7,079	3,661,116	Boots and shoes. 55; belting, 33.
	86,631	12,810	Iron and steel.	213,615	6,498,255	Pig, scrap, billets, 100.
			Iron and steel plates, etc.	125,770	5,852,967	
	8,032	300	Railroad rails.	112,817	3,136,517	Barbed wire, 58.
	416,268	2,081	Iron wire.....	218,083	9,460,705	Metal-working machinery, 44; mining, 10; sewing machines, 10; typewriters, 9.
	2,828,256	7,000	Iron and steel machinery.	140,805	55,931,787	Ham and bacon, 35; lard, 25; fresh beef, 15; canned and cured, 6.
Beef, 66; mutton, 6; sausage, 10; pork and bacon, 3.	20,760,786	91,916	Meats.....	493,953	120,843,837	

2002 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Foreign commerce, port of New York, year ending June 30, 1915—Continued.

DETAILS OF ITEMS OF LARGEST TONNAGE—Continued.

Imports.			Item.	Exports.		
Percentages of value.	Value.	Short tons.		Short tons.	Value.	Percentages of value.
Cocconut, 33; olive, 33; nut, 8.	\$13,138,424	72,903	Oils, vegetable	123,879	\$17,518,400	Cottonseed, 90.
Crude, 96; refined, 4.	2,236,058	403,300	Oils, mineral	2,700,558	68,809,801	Crude, 2; illuminating, 43; lubricating, 30; gasoline, 14.
Books and printed matter, 44; sensitized, 11; wrapping, etc., 20.	9,133,911	173,748	Paper.....	77,313	9,284,224	Books and printed matter, 34; printing, 29.
Flaxseed, 27; grass and clover, 8; castor bean, 5; sugar beet, 5.	154,349	1,706	Paraffin.....	129,098	8,583,051	Flaxseed oil cake, 84; grass and clover, 10.
	19,397,736	151,063	Seeds.....	223,052	9,077,788	Refined, 100.
Cane sugar, 90.....	121,325,978	1,881,142	Sugar.....	251,256	23,368,154	Leaf, 84; cigarettes, 6; plug, 6.
Pyrites ore.....	543,918	157,879	Sulphur.....	78,673	23,208,421	Unmanufactured, 2; wearing apparel, 39.
Leaf, 87; cigars, etc., 13.	21,978,734	16,883	Tobacco.....	933	48,700	Pigs, bars and sheets, 97; ore, 1.
Mahogany, 34; cedar, 23; rattan, 13.	3,760,864	97,421	Wood, unmanufactured.	1,875	89,100	
Unmanufactured, 40; cloth and dress goods, 41; carpets, 7.	37,714,054	104,175	Wood pulp....	25,076	13,662,116	
	37,035,656	50,627	Wool.....	108,050	15,361,945	
Ore and metal, 96....	190,879	3,670	Zinc.....			

From the records of the New York and New Jersey pilot commissioners' offices the following data concerning deep-draft ships crossing the outer bar have been compiled for the calendar year 1915:

Draft.	Outward.		Inward.	
	Vessels.	Trips.	Vessels.	Trips.
36 feet draft and under 37.....			1	1
35 feet draft and under 36.....	1	4		
34 feet draft and under 35.....	4	3	1	2
33 feet draft and under 34.....	9	29	2	3
32 feet draft and under 33.....	17	41		
31 feet draft and under 32.....	15	34		
30 feet draft and under 31.....	24	56	2	2
29 feet draft and under 30.....	49	73	4	5
28 feet draft and under 29.....	90	148	11	14
27 feet draft and under 28.....	132	236	23	33
Total.....		621		66

The total number of different ships entering or leaving the harbor with draft of 27 feet or over, in 1915, was 242.

The maximum draft of ships leaving the harbor in 1915 was 35.9 feet; the maximum draft entering was 36.5 feet, the ship being damaged by collision and leaking badly; excepting this, the maximum entering draft was 34 feet.

Before improvement of the harbor entrance ships drawing 27 feet could cross the bar at extreme high tide only.

2. NEW YORK HARBOR: CONEY ISLAND CHANNEL.

No dredging was done. The channel already dredged meets to a reasonable degree the needs of existing traffic. Examinations of the dredged channel made in the fall of 1915 and spring of 1916 indicate no notable changes; the surveys are regarded as work of maintenance.

APPROPRIATIONS.

June 28, 1906 (survey)	\$10, 000
Mar. 2, 1907	188, 300
Total of appropriations	198, 300
Transferred under authority of act of Mar. 4, 1915	74, 000
	124, 300
Received from other sources	87
Total	124, 387

COMMERCIAL STATISTICS.

The commerce during the past year consisted of ashes and garbage to Barren Island, of building materials, fuel, and other merchandise to and from Jamaica Bay, as given in detail in report on Jamaica Bay, amounting in 1915 to 750,867 tons, valued at \$7,049,795, together with a small quantity of package freight delivered at Coney Island.

During the summer months there is a large excursion travel to and from Coney Island and Rockaway Beach. The number of passengers carried by water in 1915 is reported as:

To Coney Island and Rockaway Beach	503, 352
From Coney Island and Rockaway Beach	390, 107
Total	893, 459

3. NEW YORK HARBOR: BAY RIDGE AND RED HOOK CHANNELS.

At the beginning of the year dredging was in progress in these channels, the U. S. dredges *Raritan* and *Atlantic* being leased from the Ambrose Channel improvement.

The dredge *Raritan* worked in Bay Ridge Channel until July 17, 1915, removing 41,236 cubic yards of sand and completing that part of the project. She then dredged in Red Hook Channel until January 22, 1916, when, the available funds being exhausted, she was returned to Ambrose Channel, having removed from Red Hook Channel 821,431 cubic yards.

The dredge *Atlantic* excavated in Red Hook Channel from July 1, 1915, to January 15, 1916, when she was returned, having removed 733,205 cubic yards from Red Hook Channel.

The entire work of the year consisted in excavating 1,595,872 cubic yards of sand and mud, of which 41,236 cubic yards were dredged

from shoal spots in Bay Ridge Channel, completing that channel, and 1,554,636 cubic yards were dredged from Red Hook Channel, making it available at mean low water for passage of vessels of 35 feet draft, with a possible narrow passage of 40 feet depth.

The total amount expended on this improvement during the fiscal year was \$192,838.05, all for new work.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 507), including \$75,000 (estimated) applied to Buttermilk Channel		\$1, 246, 100. 00
Present project:		
Mar. 3, 1899	\$100, 000. 00	
June 6, 1900	262, 000. 00	
Mar. 3, 1901	140, 000. 00	
June 28, 1902	100, 000. 00	
Mar. 3, 1903	272, 000. 00	
Apr. 28, 1904	175, 000. 00	
Mar. 3, 1905	200, 000. 00	
June 30, 1906	250, 000. 00	
Mar. 4, 1907	200, 000. 00	
Mar. 4, 1909	310, 000. 00	
June 25, 1910	250, 000. 00	
Mar. 4, 1911	241, 000. 00	
Mar. 4, 1913	800, 000. 00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	150, 000. 00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	125, 000. 00	
July 27, 1916	150, 000. 00	
		\$3, 225, 000. 00
Total of all appropriations and allotments		4, 471, 100. 00
Received from other sources		26, 199. 33
Grand total		4, 497, 299. 33

CONTRACT IN FORCE.

For furnishing coal to the United States dredges.
 Name of contractor: Commercial Coal Co., New York, N. Y.
 Amount: 9,000 to 25,000 tons (of 2,240 pounds) more or less.
 Unit price: \$3.39 per ton.
 Date of approval: December 3, 1915.
 Date fixed for beginning work: November 26, 1915.
 Date fixed for completing work: September 30, 1916.
 Completed: 50 per cent.

COMMERCIAL STATISTICS.

Vessels engaged in foreign trade: Arrivals, 689; departures, 796; vessels arriving and discharging cargoes elsewhere, 107; maximum reported draft, 31 feet 8 inches.

No record is available of the number of vessels in domestic trade.

¹ Does not include \$100,000 applied to Gowanus Creek Channel.

² Does not include \$45,000 applied to Gowanus Creek Channel.

Water-borne freights.

	Outbound.		Inbound.	
	Short tons.	Estimated value.	Short tons.	Estimated value.
Foreign:				
General merchandise (unclassified).....	4,027,474	\$301,373,700	2,812,700	\$140,685,000
Grain, flour, and miscellaneous.....	1,045,330	53,306,500		
Coffee, rubber, hides, etc.....			200,000	30,000,000
Sugar, fruits, etc.....			345,000	20,700,000
Dyewoods and miscellaneous.....			225,000	6,750,000
Total foreign.....	5,062,804	254,640,200	3,582,700	198,085,000
Domestic:				
Miscellaneous (unclassified).....	32,935	658,700	722,261	14,445,220
Cotton.....			25,000	1,125,000
Naval stores.....	30,000	3,300,000	122,000	5,280,000
Hay and grain.....			22,000	440,000
Building materials.....			237,000	2,844,000
Coal.....			267,794	803,282
Iron, steel, and machinery.....			55,000	1,100,000
Ice.....			85,000	85,000
Asphalt and roofing.....	15,175	570,575	46,449	895,082
Oil.....			20,000	100,000
Total domestic.....	128,110	4,238,075	1,612,504	27,058,684

Total of all freights, 10,416,118 tons.

Valuations given above are those reported by the parties handling the goods. No classification can be made of the articles reported as general merchandise and miscellaneous. These headings include large quantities of sugar, coffee, rubber, coal, provisions, building materials, and other supplies.

Since the previous year the increase in domestic freights was 113,469 tons, or 7 per cent. In foreign freights it was 2,143,466 tons, or 33 per cent, reflecting the effect of the European war upon traffic in this part of New York Harbor. Three new lines of steamships located in this part of the harbor in 1915; three of the older lines report no traffic during the year.

In addition to the above a large commerce passes through these channels to points beyond, which may be roughly estimated at 4,000,000 tons. It is carried in vessels of comparatively light draft which are not dependent upon the increased depth (40 feet mean low water) but which profit by the added width of channels.

4. NEW YORK HARBOR: GOWANUS CREEK CHANNEL.

This channel was completed in 1896 to 26 feet depth at mean low water between the harbor lines. It was dredged as close to the existing piers as was regarded safe for the piers, generally leaving 15 to 25 feet clearance and making a width of channel of 125 feet at the eastern or inner end, with somewhat greater width at the outer end where harbor lines were farther apart. The channel had shoaled considerably along the edges. This was not felt materially by navigation until the removal of the so-called Long Dock, extending for 900 feet along the north side of the channel at its outer end. Thereafter the presence of shoals of least depth of 15 feet was a notable obstruction in the waterway, particularly to ships turning. To afford relief an allotment of \$4,000 was made March 15, 1916, from the appropriation for emergencies in river and harbor works, to remove this shoal. Proposals were received and a contract entered into for dredging to make a depth of 23 feet at mean low water over an area about 300 feet long and 125 feet wide. Dredging was begun

May 8 and completed May 11, 1916, 10,817 cubic yards of sand being removed. The shoal was dredged to an effective depth of 23 feet. The improvement facilitates very much the turning of vessels in that part of the channel.

Several schemes have been advanced for the development of this part of New York Harbor for use by the largest class of ships. The location is accessible, but the narrowness of the channel can not be obviated until owners of piers consent to cutting off the ends; the prospect of this is remote.

APPROPRIATIONS.

Appropriations prior to Mar. 4, 1915 (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 507)-----	\$145,000.00
Mar. 4, 1913 (allotted Mar. 15, 1916)-----	¹ 3,228.76
Total of appropriations-----	148,228.76

NOTE.—Of the appropriations prior to March 4, 1915, \$145,000 is the estimated amount of funds appropriated for Gowanus Bay channels, and applied to Gowanus Creek.

CONTRACT IN FORCE.

For dredging in Gowanus Creek Channel, N. Y.
 Name of contractor: Morris & Cumings Dredging Co., New York, N. Y.
 Character of work: Dredging.
 Amount: 10,817 cubic yards, \$3,028.76.
 Unit price: 28 cents per cubic yard, scow measurement.
 Date of approval: Emergency contract.
 Date fixed for beginning work: April 30, 1916.
 Date fixed for completing work: May 30, 1916.
 Completed at end of fiscal year 1916.

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.
Receipts:		
Coal.....	35,000	\$122,500
Lumber.....	10,000	300,000
Ice.....	12,000	12,000
Shipments:		
Lumber.....	1,000	20,000
Subway and cellar excavation.....	600,000	.....
Total.....	658,000	354,000

Valuations given above are those reported by the parties handling the goods. These figures refer only to the tons of cargo unloaded or loaded in Gowanus Creek, between Twenty-eighth and Percival Streets.

There is a very large commerce through Gowanus Creek into Gowanus Canal, carried in barges of 8 to 10 feet draft. The tonnage of these freights can not be obtained; there were 27,799 passages of these boats through the Hamilton Avenue Bridge, and the total of cargoes is estimated at over 2,000,000 tons.

Along Gowanus Creek a large business is done in repairing steamships and smaller vessels and in harboring yachts over winter. This is not reducible to tonnage.

¹ Allotment of \$4,000, of which \$771.24 was returned to the Treasury to credit of appropriation.

5. NEW YORK HARBOR: COLLECTION AND REMOVAL OF DRIFT.

This work was carried on during the fiscal year by the following plants:

U. S. S. *Manisces*, with crew of 18, at such times as she could be spared from other duties.

U. S. launch *Ingalls*, with crew of 3 to 5 men, when she was not required for other work.

Lighter *N. S. Gallup*, leased until July 10, 1915, with crew of 4 men, at \$30 a day, supplemented by 7 men employed by the United States.

Lighter *America*, leased from July 13 to September 30, 1915, with crew of 8 men, at \$50 a day, 3 additional men furnished by the United States.

Lighter *Osceola*, leased from May 19 to June 30, 1916, with crew of 3 men, at \$40 a day, with 6 to 8 additional men furnished by the United States. This lease continues until about October 1, 1916.

During the year these boats collected and disposed of 315,060 cubic feet (about 2,460 cords) of driftwood, including piles and pile butts, dock timbers old and new, abandoned float stages, gang planks, etc., most of which was worthless except for firewood. Such of this material as was removed by the leased boats was disposed of by the lessors of the boats, who hired a landing and sold the best parts of the timber at price about sufficient to defray the rental of landing. The material collected by United States plant was deposited on private docks by consent of the owners, and subsequently removed by parties to be cut up for firewood. This driftwood was free to all comers.

The total field cost of this work was \$24,787.08, being an average cost for drift collected and removed of 7.87 cents per cubic foot, or about \$10 a cord. The cost ranged from 5½ to 11½ cents per cubic foot, being lower in summer than in winter, and lower for drift found collected in slips than for that picked up in the open channels.

The total amount expended during the fiscal year, including office expenses and supervision, was \$55,332.34, all for maintenance.

Precise data as to results of this work can not be obtained. The masters of patrol vessels under direction of the supervisor of the harbor of New York believe that they observe a considerable diminution in the quantity of floating debris in the harbor, and some of the towboat companies have stated that the number of propellers broken by striking timbers is less now than previously.

APPROPRIATIONS.

None have been made. The river and harbor act of 1915 authorized payment for this work by allotment from funds appropriated for specific portions of New York Harbor.

CONTRACT IN FORCE.

For hire of steam lighter *Osceola* for removal of drift.

Name of contractor: Ernest Rudolph, Brooklyn, N. Y.

Amount of contract: \$4,560.

Date of approval: May 20, 1916.

Date fixed for beginning work: May 23, 1916.

Date fixed for completing work: About October 1, 1916.

Completed: 29 per cent.

COMMERCIAL STATISTICS.

None are applicable to this work.

6. WALLABOUT CHANNEL, N. Y.

There were no operations during the fiscal year. The total expenditures during the fiscal year, all for contingencies, amounted to \$170.

APPROPRIATIONS.

Present project: Mar. 3, 1899.....	\$40,000.00
Transferred under river and harbor act of Mar. 4, 1915.....	8,000.00
Net total.....	37,000.00
Received from other sources.....	.50
Grand total.....	37,000.50

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
General merchandise.....	132,635	\$6,467,942	Grain, flour, and feed.....	9,551	\$310,006
Coal and other fuel.....	552,764	2,687,371	Hay and straw.....	330	6,663
Lumber.....	4,950	100,920	Fertilizer.....	2	90
Iron ore and products.....	5,225	262,406	Oysters, clams, and fish.....	1,500	40,000
Steel and products.....	3,618	82,232	Ice.....	1,500	150
Lead, tin, and products.....	5	310	Ashes and cinders.....	60,765	5,421
Asphalt, tar, etc.....	1,560	10,200	Garbage and refuse.....	990	100
Petroleum and products.....	572	415,407	Cellar dirt—excavated material, etc.....	278,980	38,490
Oils.....	23	1,800	Live stock.....	5,622	376,200
Alcohol and products.....	1,108	44,320	Iron drums.....	4	1,000
Clay and products.....	10	100	Gas oil.....	60,000	462,150
Brick.....	396	4,223	Sugar.....	34,141	3,414,100
Gravel and sand.....	51,138	17,158	Total.....	1,245,689	15,660,163
Cement, lime, etc.....	2,645	16,786			
Paving blocks.....	2,514	4,710			
Plaster, whiting, sulphur, etc.....	33,072	859,918			

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers.....	151	4,887	32	4,800	<i>Fect.</i> 6.0	<i>Fect.</i> 21.2
Sailing.....	2	20	5	100	3.5	7.0
Unrigged.....	2,025	7,747	77	2,000	1.0	22.0
Miscellaneous.....	100	198	11	14	5.0	7.0
Total.....	2,278	12,852				

Passengers carried: None.

7. NEWTOWN CREEK, N. Y.

A contract for dredging was entered into July 2, 1915. The unit price was 26½ cents per cubic yard, scow measurement. During progress of work under this contract 90,449 cubic yards were dredged, at a cost of \$25,399.35, and resulted in a restoration of about 4,200 feet of the channel to project dimensions of 18 feet at mean low water, with a width of 125 feet, including some widening at the bends and at Meeker Avenue Bridge. The section of channel worked over extended upstream from a point 800 feet below the Meeker Avenue Bridge, this section including the worst shoals in the channel. During the fiscal year the total expenditures, including office expenses, superintendence, surveys, etc., amounted to \$27,953.42, all expenditures being chargeable to maintenance.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 506)	\$197,500.00
Present project:	
June 3, 1896	\$30,000.00
June 4, 1897	183,000.00
June 13, 1902 (allotted May 20, 1904)	400.00
Mar. 3, 1905	5,000.00
Mar. 2, 1907	5,000.00
Mar. 4, 1907	15,000.00
June 25, 1910	10,000.00
Feb. 27, 1911	20,000.00
July 25, 1912	15,000.00
Mar. 4, 1913	30,000.00
Mar. 4, 1915	15,000.00
July 27, 1916	10,000.00
	<hr/> 338,400.00
Total of all appropriations and allotments	535,900.00
Received from other sources	844.21
	<hr/> 536,244.21
Grand total	

CONTRACT IN FORCE.

For dredging in Newtown Creek, N. Y.
 Name of contractor: P. Sanford Ross (Inc.), Jersey City, N. J.
 Character of work: Dredging.
 Amount: 90,449 cubic yards, \$25,399.35.
 Unit price: 26½ cents per cubic yard, scow measurement.
 Date of approval: July 8, 1915.
 Date fixed for beginning work: August 2, 1915.
 Date fixed for completion: December 2, 1915.
 Completed at end of fiscal year 1916.

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COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
General merchandise.....	123,246	\$3,937,545	Crushed stone.....	410,155	\$309,329
Coal and other fuel.....	1,729,084	5,490,347	Gravel and sand.....	452,931	299,578
Lumber.....	349,992	5,678,848	Cement, lime, etc.....	453,918	2,048,774
Lath and shingles.....	19,127	495,651	Paving blocks.....	22,132	112,229
Piles, ties, and cordwood.....	40,391	343,563	Plaster, whiting, sulphur, etc.	36,955	246,225
Iron ore and products.....	1,900	32,600	Fruits and farm products.....	156	4,680
Steel and products.....	10,955	452,453	Grain, flour, and feed.....	18,098	510,355
Copper ore and products.....	399,744	106,764,190	Hay and straw.....	2,161	43,261
Miscellaneous ores and products.....	99	5,086	Fertilizer.....	21,096	527,400
Lead, tin, and products.....	310	38,000	Manure.....	69,865	69,865
Asphalt, tar, etc.....	7,208	97,725	Ice.....	67,692	145,884
Gasoline and naphtha.....	13,061	361,258	Ashes and cinders.....	43,908	15,136
Petroleum and products.....	1,008,685	14,680,468	Garbage and refuse.....	9,216	700
Oils (essential, lubricating).....	11,991	309,460	Cellar dirt, excavated material, etc.....	53,259	13,725
Alcohol and products.....	9,541	2,992,200	Dead animals.....	7,439	
Manufactures.....	9,036	147,239	Slag.....	102,244	104,488
Clay and products.....	7,893	30,358			
Brick (building, fire).....	221,690	616,494	Total.....	5,756,102	147,086,860
Building stone and flagging.....	25,884	162,226			

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers.....	4,295	15,929	27	2,400	<i>Feet.</i>	<i>Feet.</i>
Sailing.....	785	1,120	16	1,005	4	14
Unrigged.....	5,516	17,842	50	1,599	1	14
Miscellaneous.....	28	156	152	224	4	10
Total.....	10,624	35,047				

Passengers carried: None.

NOTE.—A report from the department of bridges, New York City, shows 65,238 trips in excess of this report going through and below the first (Vernon Avenue) bridge, and an estimate of 15,000 per year below the bridge, or a total of 80,238 trips, light and loaded, which do not appear in this report.

8. JAMAICA BAY, N. Y.

During the winter the city of New York, cooperating with private parties, dredged the Mill Creek Basin to 18 feet depth, mean low water, in a channel with bottom width of 100 feet, connecting the bulkheads and landings in the vicinity of Mill Island with the main interior channel dredged in 1912-13. This was followed by a call for deepening the entrance channel to the same depth. Examination of the entrance was made, buoys were placed, and on May 24 the United States sea-type suction dredge *Atlantic*, leased from Ambrose Channel improvement, began dredging. To the close of the fiscal year she had removed 66,256 cubic yards of sand and shell, working over about 1½ miles length of channel. The increased depth resulting from this work would be about 0.3 foot, if this volume were equally distributed over the area, as was attempted. No actual detailed survey was justified at this early stage of the work.

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On May 31 the *Atlantic* ran over the Mexican cable in the channel. All of the cables had been reported in 1914 as moved outside the channel area. This cable was promptly moved away by the cable company.

The total expenditures during the year were \$11,251.74, all for new work, done by hired labor and Government plant.

APPROPRIATIONS.

Prior to present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 470).....		\$9,460.00
Present project:		
June 25, 1910.....	\$250,500.00	
July 25, 1912.....	800,000.00	
Mar. 4, 1913.....	800,000.00	
		850,500.00
Total of appropriations.....		859,960.00
Transferred under river and harbor act of Mar. 4, 1915.....		150,000.00
Net total.....		709,960.00
Received from other sources.....		114.08
Grand total.....		710,074.08

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Coal and other fuel.....	148,100	\$526,080	Plaster, whitening sulphur, etc.....	865	\$5,770
Lumber.....	12,275	286,359	Fertilizer.....	968	968
Lath and shingles.....	420	5,040	Oysters, clams, and fish.....	1,060	21,000
Flax, tin, and cordwood.....	8	8,357	Ice.....	10,000	35,000
Lead, tin, and products.....	11,624	4,068,466	Asbes and cinders.....	28,920	5,522
Gasoline.....	1,771	84,980	Garbage, tankage, and garbage grease.....	377,071	1,301,004
Petroleum and products.....	226	89,093	Cellar dirt-excavated material etc.....	45,571	5,838
Oils.....	97	4,969	Machinery.....	62	78,695
Manufactures.....	10,284	410,000	Empty barrels.....	1,750	40,000
Brick.....	4,005	13,929	Dead animals.....	10,424	10,424
Building stone and flagging.....	2,053	9,946	Total.....	750,867	7,049,795
Crushed stone.....	8,438	9,798			
Gravel and sand.....	72,353	31,545			
Cement, lime, etc.....	2,042	15,012			
Paving blocks.....	2,790	1,000			

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers, etc.....	111	2,886	10	150	<i>Fect.</i>	<i>Fect.</i>
Sailing.....	192	515	60	1,500	4	12
Unrigged.....	605	6,427	280	1,000	3	14
Miscellaneous.....	167	751	100	1,000	5	12
Total.....	1,075	10,609				

Passengers carried, 412,500.

9. SHEEPSHEAD BAY, N. Y.

A survey was made during April, 1916, to determine the existing condition of the channel. The results of this survey show that a small amount of shoaling has taken place near the outer end of the channel. No dredging was undertaken during the current season, as it was considered unnecessary. The total expenditures during the year amounted to \$646.88, chargeable to maintenance.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 68d Cong., 3d sess., p. 554) -	\$28,000.00
Present project:	
July 25, 1912	\$18,600.00
Mar. 4, 1915	5,000.00
	<u>18,600.00</u>
Total of all appropriations and allotments	44,600.00
Received from other sources	2.45
Grand total	<u>44,602.45</u>

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.
Coal and other fuel	728	\$2,388
Piles, ties, and cordwood	1	50
Gasoline	448	25,101
Petroleum and products	465	16,917
Manufactures	5	1,500
Oysters, clams, and fish	9	1,800
Ice	10,000	85,000
Total	<u>11,654</u>	<u>82,756</u>

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers, etc.	355	54,145	28	184	<i>Fed.</i> 3.0	<i>Fed.</i> 2.0
Sailing	12					
Unrigged	11	375	20	29.97	4.0	6.4
Miscellaneous	331	2,394	1	66	1.5	6.0
Total	<u>710</u>	<u>56,914</u>				

Passengers carried, 433,738.

10. HARBORS AT PORT JEFFERSON, MATTITUCK, HUNTINGTON, AND FLUSHING BAY, N. Y.

(A) PORT JEFFERSON HARBOR, N. Y.

A survey was made during December, 1915, to determine the existing condition of the channel and of the west jetty. The survey

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showed that a slight shoal had encroached upon the channel from the east. The west jetty near the low-water line was found to be somewhat in need of repairs, but not seriously damaged. The total expenditures, including office expenses, etc., amounted to \$1,158.89 and are chargeable to maintenance.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 529) - \$80,200.00

Present project:

Sept. 19, 1890.....	\$25,000.00
July 13, 1892.....	10,000.00
Aug. 18, 1894.....	7,500.00
June 3, 1896.....	7,500.00
Mar. 3, 1899.....	7,500.00
June 13, 1902 (allotted Aug. 5, 1902).....	10,500.00
Apr. 28, 1904 (allotted Sept. 13, 1904).....	1,956.35
Mar. 3, 1905 (allotted July 20, 1905).....	8,500.00
Mar. 2, 1907 (allotted Mar. 29, 1907).....	21,100.00
June 25, 1910.....	1,600.00
July 25, 1912.....	5,000.00
July 27, 1916.....	5,000.00
	<hr/> 111,156.85

Total of all appropriations and allotments..... 191,356.85

Transferred under river and harbor act of Mar. 4, 1915..... 2,000.00

Grand total..... 189,356.85

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.
General merchandise.....	4,254	\$605,525
Coal and other fuel.....	13,344	57,925
Flax, ties, and cordwood.....	620	1,550
Gasoline.....	606	24,520
Petroleum and products.....	86	3,125
Fruits and farm products.....	90	1,540
Oysters, clams, and fish.....	1,660	17,000
Rapese.....	7	1,400
Automobiles.....	190	415,550
Total.....	<hr/> 20,746	<hr/> 1,132,325

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers, etc.....	15	895	10	250	<i>Fath.</i> 4.0	<i>Fath.</i> 12
Sailing.....	3	35	40	65	3.3	5
Unrigged.....	26	74	150	450	5.0	7
Total.....	<hr/> 44	<hr/> 975				

Passengers carried, 45,284.

Boats.—One hundred and nineteen boats hauled and launched (5,100 net tons) at a local shipyard.

(B) MATTITUCK HARBOR, N. Y.

A survey was made with a view to determining the present condition of the improvement. The total expenditures during the fiscal year amounted to \$431.51, all of which is chargeable to maintenance. The channel has been greatly reduced in width, due to a shoal near the inner end of the jetties, and between them where 7-foot depth is only about 30 feet wide. Another shoal has formed about 300 feet below the milldam, reducing the mean low water depth to about 5 feet. Other shoals of minor importance exist in the channel between the inlet and the milldam, and all have formed since the channel was dredged during the fiscal year 1914. The expected revival of commerce as a result of the reopening of this harbor during 1913 and 1914 has not been fully realized. No work during the present season, or prior to the spring of 1917, is contemplated.

APPROPRIATIONS.

Present project:

June 3, 1896.....	\$10,000.00
Mar. 3, 1899.....	5,000.00
Mar. 3, 1905 (allotted July 20, 1905).....	20,000.00
Mar. 2, 1907 (allotted Mar. 29, 1907).....	40,000.00
Mar. 3, 1909 (allotted Apr. 9, 1909).....	6,000.00
June 25, 1910 (allotted Aug. 8, 1910).....	23,750.00
July 25, 1912.....	10,000.00
Mar. 4, 1913.....	10,000.00
Total of all appropriations and allotments.....	124,750.00
Received from other sources.....	18.21
Grand total.....	124,768.21

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.
Gravel and sand.....	500	\$400
Fruits and farm products.....	810	4,280
Oysters, clams, and fish.....	2	225
Total.....	1,312	4,875

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

NOTE.—Commercial statistics were repeatedly requested of all known users of the harbor. Only 5 requests received attention, resulting in the above figures.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers, etc.....	2	70	25	50	Feet. 2.5	Feet. 8
Miscellaneous.....	1	.....	.....	.....	2.0	3
Total.....	3	70	.....	.....	.....	.....

Passengers carried, 875.

(C) HUNTINGTON HARBOR, N. Y.

A contract for dredging was entered into August 14, 1915. The unit price was 20.5 cents per cubic yard, place measurement. During progress of work under this contract, 17,404 cubic yards were dredged and placed on near-by disposal areas. The work resulted in the restoration of about 1,550 linear feet of the channel to project dimensions of 8 feet depth at mean low water and width of 100 feet. This width was increased to 200 feet at a bend in the channel in front of the village wharves. To reduce maintenance costs the channel in places was actually dredged to 9 and 10 feet. The section worked over extended from the head of the channel to a point about 1,550 feet northward, this portion containing the worst shoals. The work was done at a cost of \$3,590.30. During the fiscal year the total expenditures, including office expenses, supervision, survey, etc., amounted to \$6,231.82, all chargeable to maintenance.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 466) -- \$22,500.00
Present project:

Sept. 19, 1890-----	\$10,000.00	
July 13, 1892-----	5,000.00	
Aug. 13, 1894-----	2,000.00	
June 3, 1896-----	5,000.00	
Mar. 3, 1899-----	7,500.00	
June 13, 1902 (allotted Aug. 5, 1902)-----	2,500.00	
Mar. 3, 1905 (allotted July 20, 1905)-----	2,500.00	
Mar. 2, 1907 (allotted Mar. 29, 1907)-----	3,500.00	
June 25, 1910 (allotted Aug. 8, 1910)-----	2,500.00	
Mar. 4, 1913-----	5,000.00	
Mar. 4, 1915-----	5,000.00	
		50,500.00

Total of all appropriations and allotments----- 73,000.00
Received from other sources----- 2,918.49

Grand total----- 75,918.49

CONTRACT IN FORCE.

For dredging at Hempstead and Huntington Harbors, N. Y.

Name of contractor: P. Sanford Ross (Inc), Jersey City, N. J.

Character of work: Dredging.

Amount: 29,000 cubic yards, place measurement, \$3,590.30.

Unit price: 25.5 cents per cubic yard, measured in place.

Date of approval: August 20, 1915.

Date fixed for beginning work: October 15, 1915.

Date fixed for completing work: February 15, 1916 (minimum).

Completed at end of fiscal year 1916.

COMMERCIAL STATISTICS.

Articles	Short tons.	Value.	Articles.	Short tons.	Value.
General merchandise.....	7,065	\$106,000	Paving blocks.....	419	\$411
Coal and other fuel.....	18,509	82,984	Plaster, whiting, sulphur, etc.....	226	3,853
Lumber.....	1,969	29,900	Fertilizer.....	145	330
Leak and shingles.....	213	2,800	Ashes and cinders.....	2,469	1,561
Oils and products.....	890	2,069	Cellar dirt-excavated material, etc.....	567	700
Brick.....	3,666	10,383			
Gravel and sand.....	5,227	5,400	Total.....	42,863	260,722
Cement, lime, etc.....	2,119	14,412			

It is impracticable to obtain ton-milage statistics.

Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers.....	15	428	31	800	<i>Fect.</i> 5	<i>Fect.</i> 12
Sailings.....	23	62	60	160	5	12
Unrigged.....	143	422	230	900	2	10
Total.....	181	912				

Passengers carried, 1,103.

(D) FLUSHING BAY, N. Y.

A survey was made during the fiscal year to determine the condition of the channel. The total expenditures during the fiscal year amounted to \$4,276.09, all chargeable to maintenance. From the East River to near the head of the old dike the channel has maintained itself in a very satisfactory way, but from the latter point to the Broadway Bridge there has been a gradual deterioration since the last dredging was done. It is, however, in fairly good boating condition, and does not require immediate redredging.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 451) -	\$178,900.00
Present project, Mar. 4, 1913.....	255,700.00
Total of appropriations.....	434,600.00
Transferred under river and harbor act of Mar. 4, 1915.....	110,000.00
Net total.....	324,600.00
Received from other sources.....	14.20
Grand total.....	324,614.20

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
General merchandise.....	440	\$17,868	Cement, lime, etc.....	11,817	\$84,884
Coal and other fuel.....	95,072	398,093	Paving blocks.....	4,265	14,290
Lumber.....	5,769	89,622	Plaster, whiting, sulphur, etc.	2,097	25,781
Lath and shingles.....	1,503	17,681	Fertilizer.....	5,000	15,000
Asphalt, tar, etc.....	1,599	31,980	Ice.....	20,926	41,852
Petroleum and products.....	4,678	71,591	Ashes and cinders.....	404,726	76,685
Brick.....	17,770	64,221	Cellar dirt-excavated material, etc.....	32,886	20,210
Building stone and flagging...	800	1,450			
Crushed stone.....	29,532	24,519			
Gravel and sand.....	38,590	20,268	Total.....	677,460	1,006,295

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers, etc.....	187	477	32	180	<i>Feet.</i> 5.0	<i>Feet.</i> 9.5
Sailings.....	1,033	1,088	121	550	4.0	14.5
Unrigged.....	510	1,080	80	1,000	2.0	12.0
Miscellaneous.....	5	8	450	500	2.5	4.5
Ferry boats.....	3	10,475	1,463	2,196	9.0	9.5
Total.....	1,738	13,126				

Passengers carried, 321,614.

11. HEMPSTEAD HARBOR, N. Y.

A contract for dredging was entered into August 14, 1915. The unit price was 24.2 cents per cubic yard, place measurement. During progress of the work under this contract 28,328 cubic yards were dredged and towed to sea. The work resulted in the restoration of about 4,800 linear feet of the channel to project dimensions of 6 feet depth at mean low water, and width of 80 feet. The section worked over extended from a point about 500 feet north of Wards Wharf to a point about 4,300 feet south of the same wharf, this section being in the most need of redredging. The work was done at a cost of \$7,487. During the year the total expenditures, including office expenses, supervision, surveys, etc., amounted to \$9,618.79; all chargeable to maintenance.

APPROPRIATIONS.

Present project:	
June 25, 1910.....	\$23,500.00
Feb. 27, 1911.....	23,500.00
Mar. 4, 1913.....	5,000.00
Total of appropriations.....	52,000.00
Received from other sources.....	7.27
Grand total.....	52,007.27

CONTRACT IN FORCE.

For dredging at Hempstead and Huntington Harbors N. Y.
 Name of contractor: P. Sanford Ross, (Inc.), Jersey City, N. J.
 Character of work: Dredging.
 Amount: 37,000 cubic yards (place measurement), \$8,954.
 Unit price: 24.2 cents per cubic yard, measured in place.
 Date of approval: August 20, 1915.
 Date fixed for beginning of work: October 15, 1915.
 Date fixed for completing work: February 15, 1916 (minimum).
 Completed at end of fiscal year 1916.

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
General merchandise.....	674	\$23,700	Plaster, whiting, sulphur, etc..	11,096	\$72,984
Coal and other fuel.....	17,517	63,891	Grain, flour, and feed.....	303	9,539
Lumber.....	555	13,544	Hay and straw.....	6	120
Lath and shingles.....	17	206	Locomotive crane and steam engine.....	24	8,500
Files, ties, and cordwood.....	8,990	6,232	Fresh meat.....	53	21,300
Iron ore and products.....	50	150	Vehicles.....	220	35,000
Alcohol and products.....	220	89,800	Live stock.....	1,471	441,300
Crushed stone.....	22,567	18,051	Manufactures.....	61	6,100
Gravel and sand.....	3,540,323	808,026			
Cement, lime, etc.....	39,564	99,572			
Paving blocks.....	515	559	Total.....	3,644,716	1,687,441

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

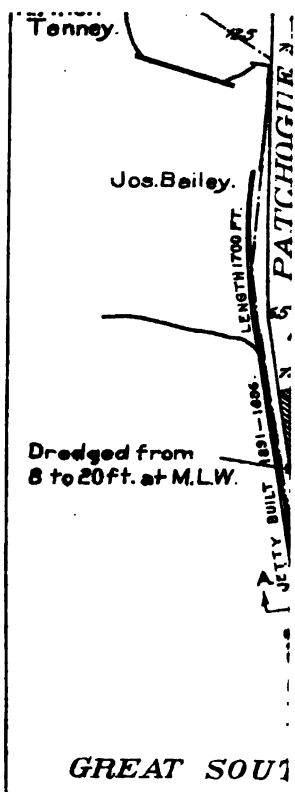
Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers.....	26	2,714	15	458	Feet. 4	Feet. 10
Sailings.....	4	46	25	30	3	6
Unrigged.....	623	7,063	15	7,500	2	12
Miscellaneous.....	195	26,354	400	700	7	10
Total.....	848	35,197				

Passengers carried, 53,715.

12. GREAT SOUTH BAY, N. Y.

The contract in force provides for the construction of a combined sand spit and riprap jetty on the east side of the entrance channel to Patchogue River, the center line of the new structure being 350 feet east of the center line of the old stone jetty on the west side of the channel. The sand spit is to be formed by pumping sand from the adjacent river channel, and the contract provides for project depth, 8 feet at mean low water, with a bottom width of 125 feet, this width being 25 feet in excess of the project width, but deemed necessary for economical maintenance and in order to provide extra material for the sand spit. The total length of channel to be restored is 2,100 feet. The sand spit is to be about 1,000 feet long, 125 feet wide on top, at an elevation of 4 feet above mean low water, and with side slopes of 1 on 10. The riprap extension is to be 400 feet long, 100 feet of its inner end embedded in the sand spit, 3 feet wide on top at an elevation of 4 feet above mean low water, and with side slopes of 1 on 1. The unit price for sand-spit construction is 16 cents per cubic yard in place in the fill, and \$3.80 per ton of 2,000 pounds for stone placed in the riprap extension. At the close of the fiscal year 25,439 cubic yards had been placed in the sand spit, partially completing its inner 700 feet, no part of which was to full cross section. No work had been done on the stone extension. About 600 feet of the channel had been restored to a depth of 8 feet and over at mean low water, with a bottom width of 125 feet.



THE HOWES PETERS CO., WASHINGTON, D. C.

RIVERS AND HARBORS—SECOND NEW YORK, N. Y., DISTRICT. 2019

Expenditures for sand-spit construction amounted to \$281.62. Office expenses, surveys, superintendence, etc., entailed an expenditure of \$2,492.56, giving a total of \$2,774.18, all chargeable to maintenance. A map showing progress of work under existing contract is submitted with this report.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 460) -	\$40,000.00
Present project:	
June 13, 1902.....	\$66,000
Mar. 3, 1905.....	2,000
Mar. 2, 1907.....	2,000
Mar. 3, 1909.....	3,000
June 25, 1910.....	50,000
Mar. 4, 1913.....	5,000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	5,000
	<hr/> 133,000.00
Total of all appropriations and allotments.....	173,000.00
Received from other sources.....	188.92
	<hr/>
Grand total.....	173,188.92

CONTRACT IN FORCE.

For sand spit and jetty construction at Great South Bay, N. Y.
 Name of contractor: Tuttle & Raynor, Eastport, N. Y.
 Character of work: Sand spit and jetty construction.
 Amount: 55,000 cubic yards (approximately), \$8,800 for sand-spit construction; 2,400 tons (approximately), \$9,120 for jetty construction.
 Unit price: 16 cents per cubic yard for filling; \$3.80 per ton for stone in place in jetty.
 Date of approval: May 9, 1916.
 Date fixed for beginning work: June 4, 1916.
 Date fixed for completing work: May 4, 1917.
 Completed: 35 per cent.

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
General merchandise.....	68	\$10,200	Gravel and sand.....	338	\$750
Coal and other fuel.....	8,502	46,059	Cement, lime, etc.....	80	800
Lumber.....	675	23,530	Fruits and farm products.....	4	450
Lath and shingles.....	20	2,200	Grain, flour, and feed.....	1	70
Gasoline.....	180	12,650	Fertilizer.....	100	1,800
Petroleum and products.....	2	50	Oysters, clams, and fish.....	1,002	16,900
Oils.....	2	315	Ice.....	40	140
Alcohol and products.....	.5	120			
Brick.....	2,812	10,560	Total.....	18,434.5	122,884
Crushed stone.....	4,608	6,600			

It is impracticable to obtain ton-mileage statistics.
 Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers, etc.....	25	50			<i>Feet.</i> 4.5	<i>Feet.</i> 7
Sailing.....	2	541			2.5	3
Motor boats.....	2	480	3	6	3.0	3
Total.....	29	1,071				

Passengers carried: None reported.

13. BROWNS CREEK, N. Y.

There were no operations during the fiscal year. A contract for dredging, for maintenance, at 17 cents per cubic yard, place measurement, was entered into, but as this contract included work at Patchogue River in progress at the close of the fiscal year nothing could be done at Browns Creek. Total expenditures for the fiscal year, including office expenses, supervision, etc., amounted to \$586.06, chargeable to maintenance.

APPROPRIATIONS.

Present project:

Sept. 19, 1890.....	\$12,000.00
July 18, 1892.....	5,000.00
Aug. 18, 1894.....	4,000.00
June 3, 1896.....	4,000.00
Mar. 3, 1899.....	3,000.00
Mar. 3, 1905.....	3,000.00
Mar. 2, 1907.....	5,000.00
June 25, 1910.....	3,000.00
Mar. 4, 1913.....	10,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	2,000.00

Total of all appropriations and allotments.....	51,000.00
Received from other sources.....	2.88

51,002.88

CONTRACT IN FORCE.

For dredging in Browns Creek, N. Y.

Name of contractor: Tuttle & Raynor, Eastport, N. Y.

Character of work: Dredging.

Amount: 12,550 cubic yards (approximate), \$2,133.50.

Unit price: 17 cents per cubic yard, place measurement.

Date of approval: May 9, 1916.

Date fixed for beginning work: June 4, 1916.

Date fixed for completing work: May 4, 1917.

Completed: None.

COMMERCIAL STATISTICS.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Coal and other fuel.....	580	\$3,000	Hay and straw.....	150	\$750
Lumber.....	188	6,500	Fertilizer.....	150	1,800
Gasoline.....	4	250	Oysters, clams, and "sh".	1,515	67,500
Oils.....	9	750	Shells.....	694	750
Brick.....	1,148	4,375	Ice.....	500	2,000
Crushed stone.....	1,440	3,000	Total.....	8,998	97,375
Gravel and sand.....	2,160	3,200			
Cement, lime, etc.....	480	3,500			

¹ The large decrease in the valuation of articles handled during the year is attributed to an unusually bad fishing season.

It is impracticable to obtain ton-mileage statistics.

Valuations given above are those reported by the parties handling the goods.

Vessel classification.

Class.	Number.	Trips one way.	Tonnage of vessels.		Draft of vessels.	
			Least.	Greatest.	Least.	Greatest.
Steamers.....	62	9,424	5	10	<i>Fect.</i> 3	<i>Fect.</i> 6
Sailing.....	50	3,000	3	100	2	7
Unrigged.....	15	900	5	100	1	4
Miscellaneous.....	20	240	5	100	1	4
Total.....	147	13,564				

Passengers carried, 9,000.

IMPROVEMENT OF RIVERS AND HARBORS IN THE THIRD NEW YORK,
N. Y., DISTRICT.

REPORT OF LIEUT. COL. C. H. M'KINSTRY, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Newark Bay and Passaic River, N. J.-----	2023	5. Raritan Bay, N. J.-----	2087
2. Hackensack River, N. J.-----	2030	6. Keyport Harbor, Mattawan Creek, Raritan, South and Elizabeth Rivers, Shoal Harbor and Compton Creek, and Cheesapeake Creek, N. J.-----	2089
3. Arthur Kill, or Staten Island Sound, N. Y. and N. J., and channel north of Shooters Island, between New York and New Jersey-----	2031	7. Shrewsbury River, N. J.-----	2048
4. Woodbridge Creek, N. J.-----	2036		

For description of improvements in this district, see pages 304 to 344.

1. NEWARK BAY AND PASSAIC RIVER, N. J.

Under a contract dated October 10, 1913, with Eugene Breymann, dredging under the projects of June 13, 1902, and March 2, 1907, was in progress at the beginning of the fiscal year and continued until completed on November 20. The work pertaining to the 12-foot project (project of June 13, 1902) was completed in July, 1915. The work under this contract practically completes the existing project of March 2, 1907, and provides for a channel 16 feet in depth and 300 feet in width to the Nairn Linoleum Works, and thence 200 feet wide to within 200 feet of the Montclair & Greenwood Lake Railroad bridge. The section worked on during the year lay between the New York, Lake Erie & Western Railroad bridge and the Montclair & Greenwood Lake Railroad bridge. The work under the 12-foot project only applied to the section between the New York, Lake Erie & Western Railroad bridge and the north wharf of the Nairn Linoleum Works. The work consisted in maintaining the 12-foot channel and completing the 16-foot channel from the Pennsylvania Railroad freight bridge to the Montclair & Greenwood Lake Railroad bridge. All material removed down to the 14-foot plane in areas not previously worked over under the project of 1907 was charged to the project of 1902, material below this plane being charged to the project of 1907. The amount of material, mud and sand, removed under this contract during the fiscal year was 439,640 cubic yards; of this amount 20,054 cubic yards were estimated as maintenance of the project of 1902. The total amount of material removed under this contract was 1,328,257 cubic yards, scow measurement; of this amount 194,597

cubic yards were estimated as maintenance of the project of 1902. The depth made was 16 to 17 feet at mean low water. The dredged material was partly disposed of by pumping it on the low and marsh lands near the site of the work and partly by dumping it at sea. The plant employed was one pump dredge with pipe lines and appurtenances, one scoop dredge, three tugboats, and six dump scows. The expenditures during the fiscal year were \$188,206.36.

In connection with the project of 1907 two wrecks were removed from the river a short distance above the Erie Railroad bridge under a separate contract at a total cost of \$1,000. Further report is made in the tabular list of wrecked vessels.

Under a contract dated December 22, 1914, with John A. Seely, dredging under the project of 1912 was in progress at the beginning of the fiscal year and continued until April 22, 1916, when operations were suspended, owing to financial troubles of the contractor. Work was resumed on June 8, 1916, and continued in progress at the close of the fiscal year. The amount of material, clay, mud, sand, and gravel removed under this contract during the fiscal year was 514,284 cubic yards, making the contract about 98 per cent complete. The total amount of material removed under the contract on July 1, 1916, was 675,817 cubic yards. The work lay in the section between the Pennsylvania Railroad freight bridge at Point-No-Point and Jackson Street, the work being nearly completed to the latter point. The depth made was 20 to 21 feet at mean low water. The dredged material was partly disposed of by pumping it on the land near the location of the dredging, and partly removed in scows and deposited on the west border of the bay at the foot of Thirtieth Street, Newark, whence it was pumped on the land for an extension of the water front of and by the city of Newark. The plant employed on the work consisted of two pump dredges with appurtenances, one bucket dredge, several dump scows, and two tugboats. The expenditures during the fiscal year were \$114,917.37.

Dredging for maintenance under the project of 1912, under a contract dated March 27, 1916, with L. T. Gaylord, was commenced on April 11 and continued in progress at the close of the fiscal year. The amount of material, mud and sand, removed under this contract during the fiscal year was 181,881 cubic yards, making the contract about 20 per cent complete. The work done consisted in restoring the 20-foot channel to full width for a distance of about 4 miles of the lower river and bay. The depth made was 21 to 22 feet at mean low water. The dredged material was partly disposed of by directly pumping it on the adjacent lands, and partly removed in scows and deposited on the west border of the bay at the foot of Thirtieth Street, Newark, to be pumped on the land for an extension of the water front of and by the city of Newark. The plant employed consisted of one hydraulic pump dredge with usual appurtenances, one bucket dredge, tugboat, and several dump scows. The expenditures during the fiscal year were \$20,574.41.

There was also expended during the fiscal year the sum of \$38.25 for maintenance of the 1872 project.

RIVERS AND HARBORS—THIRD NEW YORK, N. Y., DISTRICT. 2025

APPROPRIATIONS.

Projects of 1872 and 1880:

June 10, 1872	\$25,000. 00
Mar. 3, 1873	25,000. 00
June 23, 1874	20,000. 00
Mar. 3, 1875	20,000. 00
Aug. 14, 1876	10,000. 00
June 18, 1878	10,000. 00
Mar. 3, 1879	2,000. 00
June 14, 1880	32,000. 00
Mar. 3, 1881	50,000. 00
Aug. 2, 1882	50,000. 00
July 5, 1884	28,000. 00
Aug. 5, 1886	26,250. 00
Aug. 11, 1888	35,000. 00
Sept. 19, 1890	45,100. 00
July 13, 1892 (projects consolidated)	45,000. 00
Aug. 18, 1894	15,000. 00
June 3, 1896	15,000. 00
Mar. 3, 1899	15,000. 00
June 6, 1900 (allotment May 22, 1903)	10,000. 00
June 13, 1902 (allotment Jan. 26, 1904, and June 15, 1906)	10,000. 00
Mar. 3, 1905 (allotment May 26, 1906)	12,725. 40
Mar. 2, 1907 (allotment Sept. 16, 1907)	17,000. 00
Feb. 27, 1911	5,000. 00
July 25, 1912	5,000. 00
July 27, 1916	5,000. 00

* \$538, 075. 40

Project of 1902:

June 13, 1902	75,000. 00
Mar. 3, 1903	100,000. 00
Mar. 3, 1905	75,000. 00
Mar. 3, 1905 (allotment May 26, 1906)	27,274. 60
June 30, 1906	46,000. 00
Mar. 2, 1907 (allotment Sept. 16, 1907)	36,000. 00

359, 274. 60

Project of 1907:

Mar. 2, 1907	200,000. 00
May 27, 1908	65,000. 00
Mar. 4, 1909	200,000. 00
June 25, 1910	150,000. 00
Mar. 4, 1911	60,000. 00
Aug. 24, 1912	33,000. 00
June 23, 1913	50,000. 00
Aug. 1, 1914	92,000. 00
July 27, 1916	20,000. 00

870, 000. 00

Project of 1912:

July 25, 1912	5,000. 00
Mar. 4, 1913	300,000. 00
Oct. 2, 1914	150,000. 00
Mar. 4, 1915	100,000. 00
July 27, 1916	150,000. 00

705, 000. 00

Total of appropriations	2, 467, 350. 00
Carried to surplus fund of Treasury	480. 00
	2, 466, 870. 00
Received to date from sale of maps	350. 27
Total	2, 467, 220. 27

¹ Does not include \$1,000 allotted July 12, 1901, which was subsequently returned to Treasury.

² Of this amount the sum of \$289,826.56 was applied to previous project of 1890.

CONTRACTS IN FORCE.

Contractor: Eugene Breymann.
 Date of contract: October 10, 1918.
 Date of approval: October 18, 1918.
 Date fixed for commencement: February 7, 1914.
 Date fixed for completion: Indefinite.
 Dredging about 1,155,429 cubic yards of material, at 26½ cents per cubic yard, scow measurement.
 Completed November 20, 1915.

Contractor: John A. Seely.
 Date of contract: December 22, 1914.
 Date of approval: December 31, 1914.
 Date fixed for commencement: March 1, 1915.
 Date fixed for completion: March 2, 1916. (Waived.)
 Dredging about 679,789 cubic yards of material, at 19½ cents per cubic yard, place measurement.
 Completed at end of fiscal year: 98 per cent.

Contractor: L. T. Gaylord.
 Date of contract: March 27, 1916.
 Date of approval: April 3, 1916.
 Date of commencement: April 3, 1916.
 Date fixed for completion: October 13, 1917.
 Dredging about 900,000 cubic yards of material, at 13.3 cents per cubic yard, scow measurement.
 Completed at end of fiscal year: 20 per cent.

COMMERCIAL STATISTICS.

PASSAIC RIVER AND NEWARK BAY.

[Calendar year 1915.]

Vessel classification.

Class.	American.		Foreign.		Total.		Net registered tonnage.	Draft when loaded.	Passengers.
	Boats.	Trips.	Boats.	Trips.	Boats.	Trips.			
Registered:									
Steamers.....	50	3,090	1	10	51	3,100	20-1,200	6-26 2	100,612
Sailing.....	118	123			118	123	150- 800	5-22 0	
Barges.....	471	1,195			471	1,195	50-1,800	6-17 8	
Unregistered:									
Steamers.....	14	848			14	848		4-10 0	
Sailing.....		12				12		5-10 0	
Barges.....		3,913				3,913	41-1,000	2-14 0	
Total.....		9,181	1	10		9,191			100,612
Vessels passing to and from Hackensack River	893	5,081			893	5,081	46-1,050	4-13 0	
Total.....		14,262	1	10		14,272			100,612

RIVERS AND HARBORS—THIRD NEW YORK, N. Y., DISTRICT. 2027

PASSAIC RIVER ABOVE MONTOLAIR AND GREENWOOD LAKE RAILROAD.

Vessel classification.

(Included in above statement.)

Classes.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Registered:				<i>Feet.</i>
Steamers.....	10	1 745	30-300	6½-7
Sailing.....	50	50		
Barges.....	144	156	300-825	6-7
Unregistered:				
Steamers.....	1	125	25	4½
Sailing.....	5	7	150-160	5-6½
Barges.....		376	100-800	5-6½
Total.....	210	1,459		

¹ Including tugs.

PASSAIC RIVER AND NEWARK BAY.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Alk and beer.....	24,385 short tons.....	24,385	\$2,047,330
Ashes and sweepings.....	496,000 short tons.....	496,000	
Brick and firebrick.....	78,245,000.....	156,745	490,152
Candles and tallow.....	23,000,000 pounds.....	11,500	1,650,000
Cement and plaster.....	175,390 barrels.....	33,477	364,316
Chemicals and colors.....	29,871 short tons.....	29,871	3,250,356
Clsters.....	42,403 cubic yards.....	30,000	11,000
Clay and fire clay.....	602 short tons.....	602	2,200
Coal.....	310,284 long tons.....	347,509	1,005,833
Cocount oil.....	2,394 short tons.....	2,394	287,280
Contractor's plant.....	28,300 short tons.....	28,300	860,000
Cotton.....	16,800,000 pounds.....	8,400	5,860,000
Cotton waste.....	3,800,000 pounds.....	1,900	190,000
Fertilizers.....	74,761 short tons.....	74,761	1,735,125
Flax and jute.....	544,416 pounds.....	272	62,380
General merchandises.....	343,097 short tons.....	343,097	40,140,425
Graphite.....	1,605,890 pounds.....	803	15,066
Hollow tile.....	1,500 short tons.....	1,500	9,000
Ice.....	25,000 short tons.....	25,000	75,000
Lath.....	18,000,000.....	4,725	64,080
Lumber.....	66,537,000 feet b. m.....	127,796	2,006,087
Manufactures.....	15,822 short tons.....	15,822	2,462,000
Miscellaneous.....	9,382 short tons.....	9,382	813,180
Oils.....	501,778 short tons.....	501,778	2,764,084
Orss and metals.....	112,612 short tons.....	112,612	26,080,128
Paving blocks.....	2,659,225.....	25,858	225,538
Piling.....	500,000 linear feet.....	13,700	100,000
Steel rails.....	167 short tons.....	167	30,000
Stone and sand.....	704,526 cubic yards.....	1,012,501	694,680
Structural steel.....	58 short tons.....	58	6,980
Tars and tar products.....	3,121,548 gallons.....	13,025	82,800
Wasted yarn.....	800 short tons.....	800	1,000,000
Total.....		3,444,724	94,366,980
To and from Hackensack River.....		795,563	2,731,844
Grand total.....		4,240,287	97,098,824

2028 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

PASSAIC RIVER, ABOVE MONTCLAIR AND GREENWOOD LAKE RAILROAD.

Freight traffic.

[Included in preceding statement.]

Articles.	Amount in customary units.	Amount in short tons.	Value.
Barrels.....	6,000.....	300.....	\$6,000
Brick.....	5,887,000.....	11,780.....	40,941
Cement and plaster.....	3,510 short tons.....	2,510.....	34,255
Chemicals and colors.....	538 short tons.....	538.....	165,000
Coal.....	40,873 long tons.....	45,768.....	192,213
Cord wood.....	1,000 cords.....	1,650.....	5,750
Graphite.....	1,005,889 pounds.....	803.....	18,088
Hollow tile.....	1,500 short tons.....	1,500.....	9,000
Lath.....	375 short tons.....	375.....	3,750
Lumber.....	11,427,318 feet b. m.....	17,754.....	297,802
Machinery and manufactures.....	160 short tons.....	160.....	128,000
Miscellaneous.....	4,210,200 pounds.....	2,105.....	126,700
Oil.....	1,107,900 gallons.....	4,194.....	116,480
Paving blocks.....	170,000.....	1,700.....	11,600
Stone and sand.....	91,557 cubic yards.....	122,253.....	109,779
General merchandise.....	878 short tons.....	878.....	1,186,100
Worsted yarn.....	800 short tons.....	800.....	1,000,000
Total.....		216,072	3,381,136

The following statement showing the commerce entered at the United States customhouse, port of Newark, for the calendar year 1915 has been furnished through the courtesy of the special deputy collector of customs, New York, N. Y. :

Articles.	Amount in customary units.	Estimated value.
Received:		
Plaster rock.....	27,475 tons.....	\$41,526
Lumber (sawed).....	4,535,000 feet.....	78,821
Laths.....	8,945,000 pieces.....	21,888
Crude oil.....	15,187,280 gallons.....	240,619
Lead bullion ¹	3,022 tons.....	237,894
Sulphur ore.....	2,342 tons.....	6,486
Total.....		627,239
Shipped:		
Coal.....	22,468 tons.....	144,607
Fertilizer.....	550 tons.....	7,700
Lead, refined.....	6,840 tons.....	563,429
Total.....		715,736

¹ Carried in Newark and New York Bays bonded line.

Vessels arriving and departing engaged in foreign trade.

[Does not include local river traffic.]

Classes.	Trips.	Tonnage.
Steamers.....	43.....	57,383
Sailing.....	94.....	31,826
Total.....	136.....	89,209

Vessels registered at port of Newark, N. J., Dec. 31, 1915.

Steamers.....	34
Sailing.....	12
Barges.....	9
Gas.....	41
Pleasure yachts.....	7
Total.....	103

RIVERS AND HARBORS—THIRD NEW YORK, N. Y., DISTRICT. 2029

Statement showing number of vessels of all kinds, by months, passing through Newark Bay drawbridge of the Central R. R. Co. of New Jersey for the year ending Dec. 31, 1915.

[Furnished by Mr. Joseph O. Osgood, chief engineer Central R. R. Co. of New Jersey.]

Month.	Steamers.	Barges.	Schooners.	Sloops.	Launches.	Total.	Lifts.
January.....	906	786	10	17	5	1,784	745
February.....	821	712	8	13	.....	1,554	643
March.....	1,553	1,209	16	13	.....	2,791	1,106
April.....	1,780	1,405	16	21	60	3,282	1,278
May.....	1,800	1,365	12	41	788	4,006	1,435
June.....	1,186	1,395	26	92	1,503	4,702	1,614
July.....	1,892	1,455	28	126	2,545	6,066	1,776
August.....	1,892	1,534	30	108	1,990	5,554	1,738
September.....	1,773	1,447	27	125	1,449	4,822	1,621
October.....	1,800	1,423	29	74	560	3,886	1,430
November.....	1,685	1,388	24	52	226	3,375	1,246
December.....	1,391	1,041	21	16	42	2,511	1,051
Total.....	19,039	15,160	247	709	9,168	44,323	15,638

Statement showing number of vessels of all kinds, by months, passing through Passaic River drawbridge, at the mouth of the river, for which draw was opened, of the Central R. R. Co. of New Jersey for the year ending Dec. 31, 1915.¹

[Furnished by Mr. Joseph O. Osgood, chief engineer Central R. R. Co., of New Jersey.]

Month.	Steamers.	Barges.	Schooners.	Sloops.	Launches.	Rafts.	Catboats.	Total.
January.....	653	821	.....	17	.....	.....	.....	991
February.....	303	119	7	13	.....	.....	.....	442
March.....	521	810	4	22	.....	.....	.....	857
April.....	656	451	16	11	.....	.....	.....	1,133
May.....	908	620	37	9	.....	3	.....	1,577
June.....	1,143	704	41	11	8	.....	.....	1,909
July.....	1,104	672	23	20	2	3	.....	1,824
August.....	1,154	480	23	17	1	11	.....	1,686
September.....	905	496	33	26	1	13	.....	1,538
October.....	743	526	42	43	.....	14	.....	1,508
November.....	901	603	37	54	.....	.....	.....	1,597
December.....	806	478	19	15	.....	8	.....	1,381
Total.....	9,916	5,779	282	260	7	54	.....	16,298

¹ This is a new bridge with increased clearance over old, which allows small tugs and barges to pass through without opening the draw, which accounts for the decrease in number of boats under other years.

Statement showing number of vessels of all kinds, by months, passing through the Hackensack River drawbridge, at the mouth of river, of Central R. R. Co. of New Jersey for the year ending Dec. 31, 1915.¹

[Furnished by Mr. Joseph O. Osgood, chief engineer Central R. R. Co. of New Jersey.]

Month.	Steamers.	Barges.	Schooners.	Sloops.	Launches.	Rafts.	Catboats.	Total.
January.....	86	104	.....	.....	.....	1	.....	191
February.....	90	97	.....	.....	.....	1	.....	188
March.....	144	135	5	.....	.....	2	.....	286
April.....	133	119	3	2	1	3	.....	261
May.....	161	160	4	3	1	.....	.....	329
June.....	142	123	19	7	.....	1	.....	293
July.....	146	120	14	7	7	.....	1	296
August.....	193	181	15	10	3	.....	.....	402
September.....	173	180	13	9	2	.....	5	382
October.....	209	191	14	7	2	1	2	426
November.....	170	154	13	1	1	.....	.....	339
December.....	130	128	3	.....	1	.....	.....	261
Total.....	1,787	1,702	103	46	18	9	8	3,673

¹ This is a new bridge with increased clearance over old, which allows small tugs and barges to pass through without opening the draw, which accounts for the decrease in number of boats under other years.

2. HACKENSACK RIVER, N. J.

Dredging under a contract dated July 31, 1915, with the Maryland Dredging & Contracting Co. was commenced on September 14, 1915. Work was terminated on November 20, 1915, under a supplemental agreement dated December 14. The amount of material, mud and sand, removed under this contract was 32,624 cubic yards. The locality of this work lay between its junction with the Passaic River and deep water near the bridge of the Newark and New York branch of the Central Railroad of New Jersey, a distance of about 1 mile. The depth made was about 12 feet at mean low water. The dredged material was disposed of by placing it on dump scows which were dumped on the west border of Newark Bay near its upper end, where it was pumped on the marshland under improvement by the city of Newark for a terminal site. The plant employed on the work consisted of one scoop dredge, one pump dredge with appurtenances, one tugboat, and several dump scows. The expenditures during the fiscal year were \$6,067.02.

APPROPRIATIONS.

July 25, 1912.....	\$50,000.00
Mar. 4, 1913.....	50,000.00
July 27, 1916.....	6,000.00
Total of appropriations.....	106,000.00
Received to date from sale of maps.....	35.53
Total.....	106,035.53

CONTRACT IN FORCE.

Contractor: Maryland Dredging & Contracting Co.
 Date of contract: July 31, 1915.
 Date of approval: August 9, 1915.
 Date fixed for commencement: September 14, 1915.
 Date fixed for completion: December 14, 1915.
 Dredging about 120,000 cubic yards of material, at 12.45 cents per cubic yard, scow measurement.
 Completed November 20, 1915.¹

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Classes.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Registered:				<i>Fleet.</i>
Steamers.....	14	3,218	46-816	7-12
Sailing.....	42	94	58-900	6-12
Barges.....	162	175	65-1,050	6-13
Unregistered:				
Steamers.....	1	104	175	8
Sailing.....				
Barges.....	674	1,490	75-900	4-12
Total.....	893	5,081		

¹ Contract terminated by supplemental agreement dated Dec. 14, 1915, after removal of 32,624 cubic yards of material, scow measurement. This supplemental agreement was approved by the Chief of Engineers on Dec. 21, 1915, and by the Acting Secretary of War Dec. 23, 1915.

² Including tugs.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	13,380 M.....	26,760	\$21,075
Asphalt.....	2,800 short tons.....	2,800	55,000
Coal.....	410,618 long tons.....	459,994	1,316,951
Lath.....	1,000,000.....	125	4,500
Lumber and logs.....	6,761 M feet b. m.....	10,517	168,000
Miscellaneous.....	14,771 short tons.....	14,771	146,805
Oil.....	54,937 short tons.....	54,937	664,933
Iron clinders, ores, and metals.....	53,670 short tons.....	53,670	107,340
Sand and stone.....	117,026 cubic yards.....	153,105	116,477
Tars and tar products.....	8,708 short tons.....	8,708	55,000
Paving blocks.....	562,000.....	6,172	6,453
Lime dust.....	24,000 bags.....	1,104	2,760
Manure.....	3,000 short tons.....	3,000	5,250
Total.....		795,563	2,731,544

Statement showing number of vessels of all kinds, by months, passing through the Hackensack River drawbridge, at the mouth of river, of Central R. R. Co. of New Jersey for the year ending Dec. 31, 1915.¹

[Furnished by Mr. Joseph O. Osgood, chief engineer Central R. R. Co. of New Jersey.]

Month.	Steamers.	Barges.	Schooners.	Sloops.	Launches.	Rafts.	Catboats.	Total.
January.....	86	104	.....	.....	.....	1	.....	191
February.....	90	97	.....	.....	.....	1	.....	188
March.....	144	135	5	.....	.....	2	.....	286
April.....	133	119	3	2	1	3	.....	261
May.....	161	160	4	3	1	.....	.....	329
June.....	143	123	19	7	.....	1	.....	291
July.....	146	120	14	7	7	.....	1	298
August.....	193	181	15	10	3	.....	.....	405
September.....	173	180	13	9	2	.....	5	382
October.....	209	191	14	7	2	1	2	422
November.....	170	154	13	1	1	.....	.....	336
December.....	139	138	3	.....	1	.....	.....	280
Total.....	1,787	1,702	108	46	18	9	8	3,673

¹ This is a new bridge with increased clearance over old which allows small tugs and barges to pass through without opening the draw, which accounts for the decrease in number of boats under other years.

3. ARTHUR KILL OR STATEN ISLAND SOUND, N. Y. AND N. J., AND CHANNEL NORTH OF SHOOTERS ISLAND, BETWEEN NEW YORK AND NEW JERSEY.

(A) ARTHUR KILL OR STATEN ISLAND SOUND.

Under the 25-foot project of March 4, 1913, rock removal under a contract dated November 2, 1914, and supplemental to a contract dated October 25, 1913, with P. Sanford Ross (Inc.), was in progress at the beginning of the fiscal year and continued until completed on November 5, 1915, during which time 7,686 cubic yards were removed and accepted under the contract. Under the original contract 100,000 cubic yards were removed and under the supplemental contract 58,868 cubic yards were removed and accepted, making a total of 158,868 cubic yards. The work done was in the vicinity of the Baltimore & Ohio Railroad bridge on the west side of the channel extending 3,200 feet north of and 1,150 feet south of the bridge. The depth made was from 25 to 26 feet at mean low water. The rock removed

was loaded into dump scows and part towed to sea and dumped, and part taken to the East River and dumped under direction of Col. W. M. Black, Corps of Engineers, in connection with tunnel construction. The plant employed consisted of a chisel machine, rock breaker, 1 dipper dredge, 1 clamshell dredge, 1 tugboat, and several dump scows. The expenditures during the fiscal year were \$60,526.61.

Dredging under the 25-foot project of March 4, 1913, under a contract dated December 24, 1914, with L. T. Gaylord was continued during the year. The locality of this work lay between the Baltimore & Ohio Railroad bridge at Elizabethport and near the town dock at Carteret, N. J., a distance of 22,200 feet. The amount of material—mud, sand, clay, and gravel—removed during the year was 1,176,561 cubic yards, thus completing about 100 per cent of the amount of the contract. The depth made was about 25 feet at mean low water. The material excavated during the year was pumped directly upon the adjoining meadowland behind earthen bulkheads. The plant employed consisted of three hydraulic dredges with appurtenances. The expenditures during the fiscal year were \$253,824. 79.

Under project of March 4, 1913, a contract dated April 5, 1916, was entered into with Eugene Breymann for the removal of 160,000 cubic yards of rock and overlying material from the rock area near Shooters Island, and between the Baltimore & Ohio Railroad bridge and vicinity of Chelsea Island. Work was commenced on June 26, 1916, and the amount of material removed was 5,191 cubic yards. The plant employed consisted of one large scoop dredge, one tugboat, and several dump scows. The expenditures during the fiscal year were \$4,465.16.

Under project of March 4, 1913, a contract dated May 15, 1916, was entered into with P. Sanford Ross (Inc.) for dredging about 2,250,000 cubic yards of material, carrying the project forward from vicinity of town dock at Rahway Avenue, Carteret, N. J. Work has not yet been commenced under this contract. The expenditures during the fiscal year were \$359.69.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 558)-----		\$1,002,610.85
Present project:		
Mar. 4, 1913-----	\$500,000.00	
Oct. 2, 1914-----	400,000.00	
Mar. 4, 1915-----	400,000.00	
July 27, 1916-----	500,000.00	
		1,800,000.00
Total of appropriations-----		2,802,610.85
Nov. 30, 1915, to surplus fund of Treasury-----		70.00
Total-----		2,802,540.85
Received to date from sale of maps-----		384.23
Total-----		2,802,925.08

¹ Does not include \$49,889.15 transferred to channel north of Shooters Island.

² Includes \$25,000 transferred from project of 1902.

³ Includes \$208.91 applied on previous projects.

CONTRACTS IN FORCE.

Contractor: William H. Taylor.
 Date of contract: October 14, 1903.
 Date of approval: October 27, 1903.
 Date of commencement: November 28, 1903.
 Date of completion: August 27, 1910.
 Dredging about 3,585,000 cubic yards of material, at 14.8 cents per cubic yard, scow measurement.
 Final payment pending.

Contractor: P. Sanford Ross (Inc.).
 Date of contract: October 25, 1913.
 Date of approval: November 6, 1913.
 Date fixed for commencement: December 27, 1913.
 Date fixed for completion: March 27, 1915.
 Removing about 80,000 cubic yards of rock, at \$1.87 per cubic yard, scow measurement, which amount may be increased not exceeding 25 per cent.
 Completed at end of fiscal year: 100 per cent.

SUPPLEMENTAL CONTRACT IN FORCE.

Contractor: P. Sanford Ross (Inc.).
 Date of contract: November 2, 1914.
 Date of approval: Secretary of War, November 9, 1914; Chief of Engineers, November 6, 1914.
 Date fixed for commencement: March 27, 1915.
 Date fixed for completion: January 8, 1916.
 Removing about 50,000 cubic yards of rock, at \$1.87 per cubic yard, scow measurement.
 Completed at end of fiscal year: 100 per cent.

Contractor: L. T. Gaylord.
 Date of contract: December 24, 1914.
 Date of approval: December 29, 1914.
 Date of commencement: January 9, 1915.
 Date fixed for completion: August 19, 1916.
 Dredging about 1,428,571 cubic yards of material, at 18.2 cents per cubic yard, place measurement.
 Completed at end of fiscal year: 100 per cent.

Contractor: Eugene Breymann.
 Date of contract: April 5, 1916.
 Date of approval: April 15, 1916.
 Date of commencement: June 28, 1916.
 Date fixed for completion: November 24, 1917.
 Removing about 160,000 cubic yards of rock and overlying material at 49½ cents per cubic yard, place measurement.
 Completed at end of fiscal year: 3 per cent.

Contractor: P. Sanford Ross (Inc.).
 Date of contract: May 15, 1916.
 Date of approval: May 25, 1916.
 Date fixed for commencement: August 17, 1916.
 Date fixed for completion: October 22, 1918.
 Dredging about 2,250,000 cubic yards of material, at 12.45 cents per cubic yard, scow measurement.
 Completed at end of fiscal year: Nothing.

COMMERCIAL STATISTICS.

[The following statistics have been compiled from those for calendar year 1915, furnished by Mr. James N. Stout, secretary of the Staten Island Sound Deep Waterways Association.]

Vessel classification.

Class.	Number of trips.			Net registered tonnage.	Draft when loaded.
	Ameri-can.	Foreign.	Total.		
Registered:					<i>Fest.</i>
Steamers.....	6,949	349	7,298	50-3,746	6-30
Sailing.....	1,873	202	2,075	15-2,000	5-24
Barges.....	15,981	8	15,989	60-5,000	5-24
Unregistered:					
Steamers.....					
Sailing.....					
Barges.....	47,184		47,184	50-4,000	5-16
Power boats.....	19,692		19,692		Up to 14
Total.....	91,679	559	92,238		

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Chemicals.....	232,163 short tons.....	232,163	98,080,212
Cinders.....	3,343 short tons.....	3,343	16,715
Clay.....	11,809 short tons.....	11,809	28,618
Clay products.....	58,611 short tons.....	58,611	412,036
Coal.....	13,928,688 long tons.....	15,594,475	58,311,817
Croesties.....	262,920.....	19,471	200,000
Crude and refined asphalt.....	123,024 short tons.....	123,024	1,415,786
Felt.....	10,223,322 pounds.....	5,116	232,762
Fertilizers.....	287,080 short tons.....	287,080	7,308,330
Fire and common brick.....	6,005,000.....	10,590	130,250
General merchandise.....	284,000 short tons.....	284,000	12,300,000
Lumber.....	25,791,466 feet b. m.....	482,151	621,288
Machinery and manufactures.....	31,346,000 pounds.....	15,673	3,619,266
Miscellaneous.....	3,034,189 short tons.....	3,034,189	61,574,285
Oils and products.....	5,971,158 short tons.....	5,971,158	172,243,065
Ores and metals.....	380,345 short tons.....	380,345	68,582,783
Paper.....	55 short tons.....	55	8,800
Paving blocks.....	4,135,400.....	19,850	149,300
Rags.....	5,000 short tons.....	5,000	108,700
Rubber and rubber goods.....	12 short tons.....	12	17,922
Sand and stone.....	28,868 short tons.....	28,868	23,114
Steel.....	50,539,802 pounds.....	25,470	1,709,662
Tar and pitch.....	57 short tons.....	57	1,015
Terra cotta.....	4,121 short tons.....	4,121	79,795
Wire and cable.....	3,639 short tons.....	3,639	875,541
Total.....		26,130,270	894,896,062
25 per cent of commerce of Newark Bay and Passaic River estimated as passing through this waterway.....		1,060,069	24,274,618
Estimated commerce of other tributaries passing through this waterway.....		1,068,597	70,158,110
Total.....		28,258,936	499,328,730

NOTE.—This report does not contain the commerce from points along the Kill van Kull, which does not traverse the Staten Island Sound or Arthur Kill. There was reported for this section of this waterway 4,123,014 short tons valued at \$31,229,861.

(B) CHANNEL NORTH OF SHOOTERS ISLAND, BETWEEN NEW YORK AND NEW JERSEY.

Dredging for maintenance under contract dated August 2, 1915, with the Coastwise Dredging Co., was commenced on October 26, 1915, and continued until December 16, when work was suspended for the winter. Work was resumed on April 10 and continued until May 24, when it was completed. The work done consisted in re-dredging to restore channel dimensions over the area included in the main channel and the middle ground at the old location of Corner Stake Light. The amount of material, mud, sand, and gravel removed and accepted under the contract was 174,926 cubic yards. Depth made was 16 feet at mean low water. The dredged material was mostly disposed of by placing it in dump scows which were dumped on the west border of Newark Bay near the upper end, whence it was pumped ashore on the site of the new Newark Terminal; the remainder was dumped at sea. Plant employed on the work was 1 clamshell dredge, two tugboats, and several dump scows. A pump dredge was employed for the disposal of spoil. The expenditures during the fiscal year were \$23,104.57.

APPROPRIATIONS.

June 25, 1910.....	\$100,000.00
Mar. 4, 1911.....	90,000.00
July 25, 1912.....	¹ 19,899.15
Aug. 24, 1912.....	30,000.00
Mar. 4, 1913.....	¹ 30,000.00
Total of appropriations.....	269,899.15
Received to date from sale of maps.....	4.69
Total.....	269,898.84

CONTRACT IN FORCE.

Contractor: Coastwise Dredging Co.
 Date of contract: August 2, 1915.
 Date of approval: August 10, 1915.
 Date fixed for commencement: September 29, 1915.
 Date fixed for completion: March 9, 1916. (Waived.)
 Dredging about 171,674 cubic yards of material, at 11.65 cents per cubic yard, scow measurement.
 Completed May 24, 1916.

COMMERCIAL STATISTICS.

This is a branch channel, and the commerce to be benefited is part of the Arthur Kill and part of the Passaic River. The commerce of Arthur Kill for 1915 is reported as 28,288,936 short tons, with an estimated value of \$489,328,730, and that of Newark Bay and Passaic River for 1915 as 4,240,297 short tons, with a value of \$97,098,474.

¹By transfer from appropriation for "Improving Arthur Kill, N. Y. and N. J." (21-foot project).

4. WOODBRIDGE CREEK, N. J.

Dredging for maintenance with U. S. pump dredges *Captain Andrew Talcott* and *General G. L. Gillespie*, which were rented from New York district No. 1, was commenced on February 5 and completed on February 26, 1916. The total amount of material—mud, clay, and sand—dredged within channel limits was 18,798 cubic yards, place measurement. The channel was restored to full project dimensions for a distance of 6,000 feet between the mouth and the Vulcan Works Wharf. The material was disposed of by pumping it directly upon the land near locality of dredging. The *Talcott* was engaged on the work from February 5 to 12, inclusive, and the *Gillespie* from February 14 to 26, inclusive. There was also one tugboat and other appurtenances used by hydraulic dredges. The expenditures during the fiscal year were \$6,835.40.

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 581)-----	\$19,000.00
Present project:	
June 13, 1902-----	\$10,000.00
Apr. 28, 1904 (allotment for survey of Sept. 1, 1904)-----	250.00
Apr. 28, 1904 (allotment Nov. 18, 1904)-----	7,500.00
Mar. 3, 1905-----	6,000.00
Mar. 2, 1907-----	19,000.00
Mar. 3, 1909 (allotment Mar. 19, 1909)-----	6,000.00
June 25, 1910-----	3,000.00
Feb. 27, 1911-----	3,000.00
July 25, 1912-----	6,000.00
Mar. 4, 1913-----	3,000.00
Oct. 2, 1914-----	6,000.00
Mar. 4, 1915-----	6,000.00
July 27, 1916-----	3,000.00
	<hr/> 78,750.00
Total of appropriations-----	97,750.00
Received to date from sale of maps-----	3.69
Total-----	<hr/> 97,753.69

COMMERCIAL STATISTICS.

(Calendar year 1915.)

Vessel classification.

Classes.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Registered:				Feet.
Steamers-----	2	92	45-60	6-8
Sailing-----	21	29	50-60	5-10
Barges-----	13	37	-----	5-10
Unregistered barges-----	60	199	-----	6-9½
Total-----	96	357	-----	-----

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	12,500,000.....	25,000	\$100,000
Miscellaneous.....	1,478 long tons.....	1,655	4,251
Clay.....	12,559 short tons.....	12,559	39,127
Coal.....	3,479 long tons.....	3,897	10,440
Fire brick.....	1,955 short tons.....	1,955	21,857
Ofs.....	3,644 short tons.....	3,644	21,438
Stone and sand.....	7,089 long tons.....	8,861	7,089
Terra cotta and tile.....	364 short tons.....	364	12,183
Tin cans.....	3,312 short tons.....	3,312	25,573
Tin scrap.....	6,363 short tons.....	6,363	62,502
Total.....		67,610	305,740

5. RARITAN BAY, N. J.

Dredging for maintenance under contract dated February 28, 1916, was begun on June 13 and was continued to June 24 when the plant was removed and work suspended. The amount of material, mud and sand, removed under this contract during the year was 32,572 cubic yards. The work done consisted in widening and restoring depth to the Seguine Point Channel. The depth made was from 21 to 23 feet at mean low water. The dredged material was dumped at sea. The plant employed on the work consisted of one clamshell dredge, one tugboat, and several dump scows. The expenditures during the fiscal year were \$765.49.

APPROPRIATIONS.

Mar. 3, 1881.....	\$50,000.00	Feb. 27, 1911.....	\$20,000.00
Aug. 2, 1882.....	50,000.00	July 25, 1912.....	10,000.00
July 5, 1884.....	20,000.00	Mar. 4, 1913.....	20,000.00
Aug. 5, 1886.....	37,500.00	Oct. 2, 1914.....	20,000.00
Aug. 11, 1888.....	25,000.00	Mar. 4, 1915.....	20,000.00
Sept. 19, 1890.....	40,000.00	July 27, 1916.....	20,000.00
July 13, 1892.....	40,000.00		
Aug. 13, 1894.....	40,000.00	Total of appropria-	
June 3, 1896.....	75,000.00	tions.....	712,500.00
Mar. 3, 1899.....	65,000.00	Received to date from	
June 13, 1902.....	45,000.00	sale of maps.....	17.82
Mar. 3, 1905.....	50,000.00	Collections for supervision	
Mar. 2, 1907.....	25,000.00	of permits.....	32.49
Mar. 3, 1909 (allotment			
Mar. 19, 1909).....	20,000.00	Total.....	712,550.31
June 25, 1910.....	20,000.00		

CONTRACT IN FORCE.

Contractor: Morris & Cumings Dredging Co.

Date of contract: February 28, 1916.

Date of approval: March 11, 1916.

Date fixed for commencement: March 31, 1916. (Waived to June 5, 1916.)

Date fixed for completion: July 31, 1916.

Dredging about 120,000 cubic yards of material, at 16½ cents per cubic yard, scow measurement.

Completed at end of fiscal year: 26 per cent.

COMMERCIAL STATISTICS.

(Calendar year 1915.)

Vessel classification.

Class.	Number of trips.		Total number of trips.	Net registered tonnage.	Draft when loaded.
	Ameri-can.	Foreign.			
Registered:					<i>Fect.</i>
Steamers.....	8,309	265	8,474	5-5,406	6-23½
Sailing.....	2,041	247	2,288	7-2,400	5-22
Barges.....	4,285		4,285	75-3,000	6-13
Unregistered:					
Steamers.....	207	17	224		
Sailing.....	428		428		
Barges.....	26,889		26,889	125	
Total.....	42,059	529	42,588		

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Imports.....	228,650 short tons.....	228,650	\$8,509,000
Exports.....	110,925 short tons.....	110,925	3,350,692
Fireproofing.....	117,600 short tons.....	117,600	888,890
Coal.....	5,395,405 long tons.....	6,042,854	16,186,215
Clay and sand.....	4,050 long tons.....	4,586	3,983
Explosives.....	990 long tons.....	1,009	504,400
Iron pipe.....	728 long tons.....	813	65,000
Wire rods.....	825 long tons.....	924	36,960
Total.....		6,507,311	29,244,980
Commerce of South River, Raritan River, Cheese- quake Creek, Keyport Harbor, Matawan Creek, Shoal Harbor, and Compton Creek, and 20 per cent of commerce of Arthur Kill that passes over Raritan Bay.....		2,630,579	108,063,479
Grand total.....		10,137,890	137,298,379

The following statement, showing the commerce entered at the United States customhouse, port of Perth Amboy, for the calendar year 1915, has been furnished through the courtesy of the collector of customs, Perth Amboy, N. J.:

Articles.	Amount in customary units.	Amount in short tons.	Value.
Received:			
Pyrites (iron).....	60,888,514 pounds.....	40,027	\$98,055
Copper ore.....	54,876,100 pounds.....	37,438	1,057,316
Crude asphalt.....	118,646,080 pounds.....	50,323	\$60,855
Copper matte.....	83,746,000 pounds.....	16,373	\$94,330
Silver ore.....	12,432,000 pounds.....	6,216	3,822,760
Lead ore.....	4,821,600 pounds.....	2,162	96,728
Copper bullion.....	4,461,672 pounds.....	2,236	621,742
Plaster rock.....	2,464,000 pounds.....	1,132	2,888
Sulphur ore.....	13,924,800 pounds.....	6,449	17,600
Petroleum oil.....	19,346,088 pounds.....	80,963	349,417
Cresote oil.....	13,644,068 pounds.....	6,322	1,008,321
Total.....		228,650	8,509,000
Shipped:			
Fertilisers.....	38,514,326 pounds.....	19,267	192,680
Coal.....	96,702,000 pounds.....	47,821	643,321
General merchandise.....	4,620,000 pounds.....	2,460	63,369
Refined lead.....	82,662,360 pounds.....	41,327	2,463,321
Total.....		110,925	3,350,692

Vessels arriving and departing port of Perth Amboy, N. J.

Class.	Arrived.			Departed.		
	Number.	Average tons.	Average draft.	Number.	Average tons.	Average draft.
Steamers in foreign trade.....	58	2,000	<i>Feet.</i> 23	31	2,000	<i>Feet.</i> 23
Sailing vessels in foreign trade.....	3	200	16	235	200	16
Steamers in coastwise trade.....	100	2,000	1 23			23
Sailing vessels in coastwise trade.....	144	200	1 16			
Total.....	306			266		

¹ Arrived and departed.*Vessels registered at port of Perth Amboy for said period.*

Steamers.....	106
Barges.....	81
Sailing.....	314
Total.....	501

6 KEYPORT HARBOR, MATAWAN CREEK, RARITAN, SOUTH, AND ELIZABETH RIVERS, SHOAL HARBOR AND COMPTON CREEK, AND CHEESEQUAKE CREEK, N. J.

(A) KEYPORT HARBOR, N. J.

Dredging under a contract dated March 14, 1916, with John & Joseph McSpirit was commenced on April 13, 1916, and continued until completed on May 10. The amount of material—mud—removed and accepted under contract was 25,028 cubic yards. The work done consisted in redredging and partially restoring the channel dimensions between the steamboat dock at Keyport and the 8-foot contour in the bay, a distance of about 3,500 feet. Depth made was from 8 to 9 feet at mean low water. The dredged material was dumped at sea in the public dumping ground. Plant employed on the work consisted of one clamshell dredge, one tugboat, and four dump scows. The expenditures during the fiscal year were \$8,176.12.

APPROPRIATIONS.

Aug. 2, 1882.....	\$30,475.00
July 13, 1892.....	5,000.00
Aug. 18, 1894.....	5,000.00
June 3, 1896.....	2,500.00
Mar. 3, 1899.....	2,500.00
June 13, 1902 (allotment Aug. 1, 1902).....	5,000.00
June 13, 1902 (allotment May 31, 1904).....	5,000.00
Mar. 3, 1905 (allotment Aug. 12, 1905).....	5,000.00
Mar. 2, 1907 (allotment Mar. 20, 1907).....	8,705.97
Mar. 3, 1909 (allotment Mar. 25, 1909).....	5,000.00
June 25, 1910 (allotment Aug. 23, 1910).....	18,872.74
Feb. 27, 1911 (allotment Mar. 9, 1911).....	5,000.00
July 25, 1912 (allotment Aug. 30, 1912).....	5,000.00
Mar. 4, 1913 (allotment Apr. 4, 1913).....	5,000.00
Mar. 4, 1915.....	5,000.00
July 27, 1916 (allotment Sept. 6, 1916).....	5,000.00
Total of appropriations.....	118,053.71
Received to date from sale of maps.....	1.86
Total.....	118,055.57

CONTRACT IN FORCE.

Contractor: John & Joseph McSpirit.
 Date of contract: March 14, 1916.
 Date of approval: March 21, 1916.
 Date fixed for commencement: April 12, 1916.
 Date fixed for completion: July 12, 1916.
 Dredging about 28,000 cubic yards of material, at 30 cents per cubic yard, scow measurement.
 Completed May 10, 1916.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	American.		Net registered tonnage.	Draft when loaded.	Passengers.
	Boats.	Trips.			
Registered:					
Steamers ¹	46	3,285	5-468	Feet. 19	100,000
Sailing vessels ²	75	75			
Barges.....	40	48		6-7	
Unregistered:					
Steamers ¹	200	200			
Sailing vessels ²	50	50			
Barges.....	40	40	500-800	8-9	
Total.....	451	3,648			100,000
Commerce of Matawan Creek that passes through Keyport Harbor.....	28	27		5-9½	
Total.....	474	3,675			100,000

¹ And under.² Including estimate for power boats.³ Estimated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	5,389 long tons.....	6,036	\$23,150
General merchandise.....	8,750 short tons.....	8,750	806,250
Market produce.....	22,000 short tons.....	22,000	770,000
Oysters.....	201,000 bushels.....	6,030	201,000
Stone and sand.....	3,333 cubic yards.....	5,000	5,000
Total.....		47,816	1,810,400
Commerce of Matawan Creek that passes through Keyport Harbor.....		11,974	44,608
Total.....		59,790	1,855,008

(B) MATAWAN CREEK, N. J.

Dredging for maintenance with U. S. pump dredge *Capt. Andrew Talcott*, rented from New York district No. 1, was commenced on December 18, 1915, and continued until February 2, 1916. The amount of material, mud, and sand dredged within channel limits was 33,388 cubic yards, place measurement. Work was commenced at the steamboat dock at Keyport and carried up to the town dock at Matawan, a distance of about 9,500 feet. The channel over this length was restored to full project dimensions. The depth made was about 4 to 5 feet at mean low water. The dredged material was

disposed of by pumping directly upon the adjoining marsh lands. The plant employed consisted of one hydraulic dredge, one tugboat, and appurtenances. The expenditures during the fiscal year were \$13,095.65.

APPROPRIATIONS.

Mar. 3, 1881	\$15,000.00
Aug. 2, 1882	6,000.00
Sept. 19, 1890	2,500.00
July 13, 1892	9,620.00
Aug. 18, 1894	3,000.00
June 3, 1896	3,000.00
Mar. 3, 1899	3,000.00
June 13, 1902 (allotment Aug. 1, 1902)	3,000.00
June 13, 1902 (allotment May 31, 1904)	¹ 2,684.39
Mar. 3, 1905 (allotment Aug. 12, 1905)	3,000.00
Mar. 2, 1907 (allotment Mar. 20, 1907)	6,000.00
Mar. 3, 1909 (allotment Mar. 20, 1909)	3,000.00
June 25, 1910 (allotment Aug. 23, 1910)	6,000.00
Feb. 27, 1911 (allotment March 9, 1911)	3,000.00
July 25, 1912 (allotment Aug. 30, 1912)	6,000.00
Mar. 4, 1913 (allotment Apr. 4, 1913)	3,000.00
Oct. 2, 1914 (allotment Oct. 26, 1914)	3,000.00
Mar. 4, 1915	² 11,000.00
Total of appropriations	91,804.39
Received to date from sale of maps	2.99
Total	91,807.38

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Unregistered:				<i>Feet.</i>
Steamers	1	1		
Barges	22	26		5-9½
Total	23	27		

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick	5,890,900	7,362	\$85,000
Coal	1,506 long tons	1,697	3,853
Sand and stone	500 cubic yards	900	600
Top soil	1,500 cubic yards	2,025	5,250
Total		11,974	44,603

(C) RARITAN RIVER, N. J.

During the fiscal year an examination of the channel was made. Specifications to cover dredging for maintenance were drawn, approved, and advertised. Bids were to have been opened on February

¹ Original amount \$3,000, less \$215.61 returned to Treasury Jan. 3, 1905.

² \$2,000 additional by transfer from Raritan River, May 31, 1916.

10, 1916, but no proposals were received. Inquiry was made with a view of securing proposals in the open market. No satisfactory offers were received. The expenditures during the fiscal year were \$1,464.82.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 535) - \$13, 963. 00
Present project:

June 18, 1878	\$200, 000. 00
Mar. 3, 1879	60, 000. 00
June 14, 1880	100, 000. 00
Mar. 3, 1881	25, 000. 00
Aug. 2, 1882	25, 000. 00
July 5, 1884	35, 000. 00
Aug. 5, 1886	28, 250. 00
Aug. 11, 1888	50, 000. 00
Sept. 19, 1890	50, 000. 00
July 13, 1892	40, 000. 00
Aug. 18, 1894	20, 000. 00
June 3, 1896	20, 000. 00
Mar. 3, 1899	20, 000. 00
June 13, 1902 (allotment Aug. 1, 1902)	20, 000. 00
Mar. 8, 1905 (allotment Aug. 12, 1905)	22, 000. 00
Mar. 2, 1907 (allotment Mar. 20, 1907)	16, 975. 42
Mar. 8, 1909 (allotment Mar. 20, 1909)	10, 000. 00
June 25, 1910 (allotment Aug. 23, 1910)	21, 994. 39
Feb. 27, 1911 (allotment Mar. 9, 1911)	10, 000. 00
July 25, 1912 (allotment Aug. 30, 1912)	5, 000. 00
Mar. 4, 1913 (allotment Apr. 4, 1913)	10, 000. 00
Mar. 4, 1915	¹ 3, 000. 00
	<hr/> 790, 219. 81
Total of appropriations	804, 182. 81
Received from sale of condemned property	1. 15
Received to date from sale of maps	7. 30
Recovered from surety on contract	<hr/> 7, 907. 00
Total	<hr/> 812, 098. 26

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Classes.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Registered:				<i>Fect.</i>
Steam		1, 562	50-493	6-10
Sailing		323	100-160	6-12
Barges		2, 099	230-750	6-13
Yachts		603		
Unregistered:				
Steam	5	17		
Sailing	6	71		
Barges		1, 194	125-600	6-9
Total		5, 859		
Vessels engaged in commerce on South River that pass over Raritan River	128	361		
Total		6, 220		

¹ Original allotment \$10,000, of which \$7,000 was transferred to other works.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	129,615,677.....	261,008	\$1,088,728
Chemicals and colors.....	625,630 pounds.....	313	9,586
Cement and plaster.....	306,110 pounds.....	156	3,000
Clay.....	60,516 short tons.....	60,516	125,453
Coal.....	85,627 long tons.....	95,912	309,237
Asphalt.....	900 short tons.....	900	22,500
General merchandise.....	100,152 short tons.....	100,152	6,172,162
Fireproofing.....	109,400 short tons.....	109,400	547,000
Manufactures.....	1,186,183 pounds.....	598	120,000
Oils and greases.....	248,620 gallons.....	1,254	29,462
Ors and metals.....	227,750,218 pounds.....	113,874	39,286,913
Rubber and rubber goods.....	14,500,392 pounds.....	7,249	7,975,118
Saltpeter.....	336,000 pounds.....	168	9,545
Stone and sand.....	145,228 cubic yards.....	223,094	144,435
Pyrites cinder.....	8,718,296 pounds.....	4,359	84,469
Wool and cotton yarn.....	150,000 pounds.....	75	195,000
Surgical dressings.....	31,901,363 pounds.....	15,951	7,000,000
Gun cotton.....	4,236,408 pounds.....	2,118	2,541,845
Petroleum products.....	40,739 packages.....	2,915	580,000
Cigars and tobacco.....	2,725,203 pounds.....	1,362	2,500,000
Total.....		991,368	68,642,882
Commerce of South River that passes over Raritan River.....		111,226	512,461
Total.....		1,102,594	69,155,343

(D) SOUTH RIVER, N. J.

Specifications to cover maintenance dredging by contract were drawn, approved, and advertised. Bids were to have been opened on February 10, 1916, but no proposals were received. Inquiry was made with a view to securing a satisfactory proposal in the open market. No satisfactory proposition was received. The expenditures during the fiscal year were \$333.30.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 557) — \$20,000.00

Present project:

June 14, 1880.....	\$40,000.00
Mar. 3, 1881.....	6,000.00
Aug. 2, 1882.....	10,000.00
Aug. 5, 1886.....	5,000.00
Aug. 11, 1888.....	5,000.00
Sept. 19, 1890.....	5,000.00
July 13, 1892.....	7,000.00
Aug. 18, 1894.....	5,000.00
June 3, 1896.....	5,000.00
Mar. 3, 1899.....	5,000.00
June 13, 1902 (allotment Aug. 1, 1902).....	5,000.00
Mar. 3, 1905 (allotment Aug. 12, 1905).....	5,000.00
Mar. 2, 1907 (allotment Mar. 20, 1907).....	13,178.63
Mar. 3, 1909 (allotment Mar. 25, 1909).....	5,000.00
June 25, 1910 (allotment Aug. 23, 1910).....	19,380.63
Feb. 27, 1911 (allotment Mar. 9, 1911).....	5,000.00
July 25, 1912.....	87,000.00
Mar. 4, 1913 (allotment Apr. 4, 1913).....	8,000.00
	240,559.26

Total of appropriations.....	260,559.26
Transferred under authority of river and harbor act of Mar. 4, 1915.....	38,000.00
	222,559.26
Received to date from sale of maps.....	12.23
Recovered from surety on contract.....	598.00
Total.....	223,164.49

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Registered:				<i>Feet.</i>
Steamers.....	2	78	50-208	7½-10
Sailing.....	7	13	100-160	5-8
Barges.....	25	68	220-520	6-8
Unregistered:				
Steamers.....	1	1		
Barges.....	93	201	220-600	6-9
Total.....	128	361		

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	13,061 long tons	14,630	\$56,868
Broken glass.....	747 short tons	747	3,500
Brick.....	39,000,100	53,958	205,585
Empty crates.....	80,000 crates	150	3,000
Farm products.....	800 short tons	800	40,000
Manure and fertilizer.....	2,312 short tons	2,312	4,015
Clay products.....	26,520 short tons	26,520	188,374
Clay.....	12,109 short tons	12,109	12,109
Total.....		111,226	513,461

(E) ELIZABETH RIVER, N. J.

No dredging has been done on this improvement during the fiscal year. Action has been taken by the city of Elizabeth toward meeting the conditions imposed by this project, and progress toward a satisfactory adjustment has been made. A survey of the river on the location covered by the project has been made. Two public hearings were held in the city of Elizabeth by the district officer with a view toward establishing harbor lines before the question of dredging under the project is fully established. The expenditures during the fiscal year were \$530.38.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 447).....	\$59,944.45
Present project, Mar. 4, 1913.....	15,443.00
Total of appropriations.....	75,887.45
Received to date from sale of maps.....	1.10
Total.....	75,888.55

COMMERCIAL STATISTICS.

(Calendar year 1915.)

Vessel classification.

Class.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Registered, barges.....		236	100-600	<i>Feet.</i> 4-9
Unregistered:				
Steam.....	1	1		
Sailing.....	3	38	601	4-6
Barges.....	70	70	100-450	4-5
Total.....		345		

Freight traffic.

Article.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	1,110,500 brick.....	2,250	\$8,312
Felt.....	18,744,392 pounds.....	9,372	390,420
Lumber.....	3,275,000 feet b. m.....	3,525	93,875
Miscellaneous.....	175 short tons.....	175	7,000
Oil.....	6,703 barrels.....	1,675	17,083
Rags.....	14,750,935 pounds.....	7,375	145,136
Roan.....	3,000 barrels.....	750	27,000
Slag.....	13,317 pounds.....	64	28
Stone and sand.....	2,395 cubic yards.....	3,265	2,172
Total.....		28,393½	691,027

(F) SHOAL HARBOR AND COMPTON CREEK, N. J.

Dredging for maintenance under an emergency contract dated March 24, 1915, with Messrs. John and Joseph McSpirt was in progress at the beginning of the fiscal year and continued until July 17, when the contract was completed. Work was done at the bend of the channel near the entrance to the creek. A length of 435 feet and width of 70 feet was restored to project depth. During the year there was removed under this contract 5,054 cubic yards of sand, making a total of 8,179 cubic yards removed under the contract. The depth made was 4 to 5 feet at mean low water. The plant employed consisted of one bucket dredge, one pump dredge, one tugboat, and three dump scows. There was expended during the fiscal year \$4,390.98.

Dredging in the bend of the channel at the entrance to the creek was commenced on March 3, 1916, with the United States pump dredge *General G. L. Gillespie*, rented from the New York district No. 1; but no progress was made, owing to bad weather encountered and because the plant was not in working order, and on March 7 the work was abandoned, pending the necessary changes and repair to the plant. Later the dredge was withdrawn from the district. No yardage could be estimated for. The plant employed consisted of one pump dredge, one tugboat, water boat, pipe lines, and other appurtenances. There was expended during the fiscal year \$3,730.11.

Inquiries have been made with the view of securing a satisfactory proposal in the open market for completing this work. No satisfactory proposition was offered.

APPROPRIATIONS.

Sept. 19, 1890.....	\$5,000. 00
July 13, 1892.....	3,000. 00
Aug. 18, 1894.....	3,000. 00
June 3, 1896.....	5,000. 00
Mar. 3, 1899.....	8,000. 00
June 13, 1902 (allotted Aug. 1, 1902).....	8,000. 00
Mar. 3, 1905 (allotted Aug. 12, 1905).....	5,000. 00
Mar. 2, 1907 (allotted Mar. 20, 1907).....	9,750. 57
June 25, 1910 (allotted Aug. 23, 1910).....	8,752. 24
Feb. 27, 1911 (allotted Mar. 9, 1911).....	5,000. 00
July 25, 1912 (allotted Aug. 30, 1912).....	5,000. 00
Mar. 4, 1913 (allotted Apr. 4, 1913).....	5,000. 00
Oct. 2, 1914 (allotted Oct. 26, 1914).....	5,000. 00
Mar. 4, 1915 (by transfer May 31, 1916).....	5,000. 00
July 27, 1916 (allotted Sept. 6, 1916).....	5,000. 00
Total of appropriations.....	85,502. 81
Received to date from sale of maps.....	3. 05
Total.....	85,505. 86

CONTRACT IN FORCE.

Contractor: John and Joseph McSpirit.

Date of contract: March 24, 1915.

Date fixed for commencement: June 12, 1915.

Date fixed for completion: August 12, 1915.

Dredging about 8,179 cubic yards of material, at 48.9 cents per cubic yard, scow measurement.

Completed July 17, 1915.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Classes.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Registered:				<i>Feet.</i>
Sailing.....	4	440	111	17
Barges.....	2	4	600	7-9
Power boats.....	45	4,200	10	17
Unregistered:				
Sailing.....	16	300	.....	3-5
Power boats.....	160	4,000	.....	4-5
Total.....	227	8,944	.....	.....

¹ And under.

RIVERS AND HARBORS—THIRD NEW YORK, N. Y., DISTRICT. 2047

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick and tile.....	1,000 short tons.....	1,000	\$3,000
Cement and plaster.....	1,750 barrels.....	350	4,500
Clams.....	10,000 short tons.....	10,000	125,000
Coal.....	2,070 long tons.....	2,318	11,500
Coal tar.....	200 barrels.....	30	1,500
Fertilizers.....	700 short tons.....	700	25,200
Fish.....	4,500 short tons.....	4,500	340,000
Ice.....	1,200 short tons.....	1,200	3,600
Oil.....	3,940 barrels.....	493	8,280
Soap.....	70 barrels.....	7	1,000
Total.....		20,598	523,560

(G) CHEESEQUAKE CREEK, N. J.

No work was done on this improvement during the fiscal year.

APPROPRIATIONS.

June 14, 1880.....	\$20,000.00
Mar. 3, 1881.....	5,000.00
Aug. 2, 1882.....	15,000.00
Mar. 3, 1905 (allotment Aug. 12, 1905).....	5,000.00
Mar. 3, 1905 (allotment June 19, 1906).....	747.32
Mar. 2, 1907 (allotment Mar. 20, 1907).....	3,604.96
June 25, 1910 (allotment Aug. 23, 1910).....	5,000.00
Feb. 27, 1911 (allotment Mar. 9, 1911).....	2,500.00
July 25, 1912 (allotment Aug. 30, 1912).....	2,500.00
Mar. 4, 1913 (allotment Apr. 4, 1913).....	2,500.00
Total of appropriations.....	61,852.28
Received to date from sale of maps.....	1.45
Total.....	61,853.73

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	American.		Net registered tonnage.	Draft when loaded.
	Boats.	Trips.		
Registered steamers.....	1	90	238	Feet. 8
Unregistered barges.....	13	13	350-600	6-84
Total.....	14	103		

Freight traffic.

Article.	Amount in customary units.	Amount in short tons.	Value.
Clay.....	15,033 short tons.....	15,033	\$24,634
Farm products.....	150,000 crates.....	2,500	125,000
Manure.....	5,869 short tons.....	5,869	8,803
Total.....		23,402	158,437

¹ Original allotment \$1,000, of which \$252.68 was returned to Treasury.

7. SHREWSBURY RIVER, N. J.

Under date of April 12, 1916, specifications were issued for dredging in the river below the Highlands Bridge, in connection with building an embankment for the ordnance railroad at south end of Sandy Hook. Bids were opened on April 22. Later the lowest bidder, the Atlantic, Gulf & Pacific Co., submitted a lower offer, under a modification of the specifications, which offer was accepted with the approval of the department and contract entered into under date of May 17. Work was commenced on June 5, 1916, and continued in progress at the close of the fiscal year. There was removed under the contract 94,291 cubic yards, of which 32,672 cubic yards were removed from the bend at the entrance to the channel opposite the dike and deposited behind the dike. The depth made was 8 to 9 feet at mean low water. The remainder, 61,619 cubic yards, was taken from an area west of Island Beach and deposited in an embankment for the ordnance railroad at the south end of Sandy Hook Reservation and in a dam to close the channel east of Island Beach. The plant employed consisted of one pump dredge with appurtenances. The expenditures during the fiscal year were \$452.38.

Specifications for maintenance dredging were prepared and approved by the Chief of Engineers January 27, 1916. Proposals were advertised and opened on February 24, 1916. Only one bid was received and this was rejected as excessive. Under an open-market proposal dated June 2, 1916, an emergency contract was entered into under date of June 10 with George Field for this work. Work was commenced on June 12 and completed on June 27, and the total amount of material removed under this contract was 10,051 cubic yards, of which 5,255 cubic yards were removed from the shoal below and near the Highlands Bridge and the remainder, 4,796 cubic yards, from Reeves Channel. The depth made was about 8 feet at mean low water. The material was dumped near the dam in the old channel east of Island Beach. The plant employed consisted of one dredge, one tugboat, and four dump scows. The expenditures during the fiscal year were \$45.46.

There was also expended the sum of \$2,547.84 for final payment to contractor for work completed prior to the beginning of the fiscal year and for engineering and contingencies.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 555) -- \$20,500.00

Present project:

June 18, 1878	\$18,000.00
Mar. 3, 1879	10,000.00
June 14, 1880	30,000.00
Mar. 3, 1881	86,000.00
Aug. 2, 1882	30,000.00
Aug. 5, 1886	10,000.00
Aug. 11, 1888	10,000.00
Sept. 19, 1890	10,000.00
July 18, 1892	10,000.00
Aug. 18, 1894	5,000.00
June 3, 1896	15,000.00
Mar. 3, 1899	10,000.00
June 6, 1900 (allotment June 30, 1900)	10,000.00
June 13, 1902	75,000.00

RIVERS AND HARBORS—THIRD NEW YORK, N. Y., DISTRICT. 2049

Present project—Continued.

Mar. 3, 1905	\$20,000.00
Mar. 2, 1907	10,000.00
Mar. 3, 1909 (allotment Mar. 19, 1909)	20,000.00
June 25, 1910	10,000.00
Feb. 27, 1911	10,000.00
July 25, 1912	10,000.00
Mar. 4, 1913	10,000.00
Oct. 2, 1914	10,000.00
Mar. 4, 1915	18,000.00
July 27, 1916	10,000.00
	<hr/> \$457,000.00

Total of appropriations	477,500.00
Received to date from sale of maps	34.67
	<hr/>
Total	477,534.67

CONTRACTS IN FORCE.

Contractor: Atlantic, Gulf & Pacific Co.

Date of contract: May 17, 1916.

Date of approval: May 20, 1916.

Date fixed for commencement: May 27, 1916.

Date fixed for completion: September 17, 1916.

Dredging about 44,000 cubic yards of material, at 11½ cents per cubic yard, place measurement.¹

Completed at end of fiscal year: 75 per cent.

Contractor: George Field.

Date of contract: June 10, 1916.

Date of commencement: June 12, 1916.

Date fixed for completion: August 12, 1916.

Dredging about 10,000 cubic yards of material, at 45 cents per cubic yard, scow measurement.

Completed June 27, 1916.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Classes.	American.		Net registered tonnage.	Draft when loaded.	Passengers.
	Boats.	Trips.			
Registered:				<i>Feet.</i>	
Steamers	8	1,403	153-685	4½-7	305,732
Sailing	7	263	15-61	4-7	
Barges	24	24	385-500	6½-7	
Unregistered barges	2	2			
Total	41	1,692			305,732

¹ This contract also provides for dredging 210,000 cubic yards of material, place measurement, from the Shrewsbury River outside of the limits of the improvement, depositing the same in an embankment at Sandy Hook, N. J.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	750,000	1,500	\$4,000
Cement.....	1,000 short tons.....	1,000	14,500
Coal.....	3,928 long tons.....	4,400	17,123
Farm produce.....	50,000 short tons.....	50,000	500,000
Fertilizer.....	150 short tons.....	150	3,000
Fish.....	500 short tons.....	500	100,000
General merchandise.....	52,666 short tons.....	52,666	2,700,000
Grain.....	150 short tons.....	150	3,250
Lumber.....	5,000,000 feet b. m.....	10,000	60,000
Machinery and manufactures.....	1,500 short tons.....	1,500	75,000
Miscellaneous.....	6,666 short tons.....	6,666	500,000
Oil.....	50 short tons.....	50	5,000
Stone and sand.....	10,403 cubic yards.....	12,430	11,475
Total.....		141,012	3,968,348

IMPROVEMENT OF RIVERS AND HARBORS IN THE PHILADELPHIA, PA., DISTRICT.

REPORT OF MAJ. J. C. OAKES, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Delaware River, N. Y., N. J., and Pa., at or near mouth of Neversink River.....	2051	4. Delaware River, Pa., N. J., and Del., Philadelphia, Pa., to the sea.....	2054
2. Delaware River, N. J., Lalor Street, Trenton, to upper railroad bridge.....	2051	5. Ice harbor at Marcus Hook, Pa.	2068
3. Delaware River, Pa. and N. J., Philadelphia, Pa., to Trenton, N. J.....	2053	6. Constructing pier in Delaware Bay, near Lewes, Del.....	2068
		7. Harbor of refuge, Delaware Bay, Del.....	2089

FOR A DESCRIPTION OF THE IMPROVEMENTS IN THE DISTRICT, SEE PAGES 344 TO 364.

1. DELAWARE RIVER, N. Y., N. J., AND PA., AT OR NEAR MOUTH OF NEVERSINK RIVER.

No work has as yet been undertaken under the adopted project, and it was recommended in a report on the reexamination of the locality, printed in House Document No. 600, Sixty-fourth Congress, first session, that the project be abandoned. The sum of \$6,612.50 appropriated for this work has been transferred to the improvement of Delaware River at Trenton, N. J., under authority of the river and harbor act approved March 4, 1915.

APPROPRIATIONS.

June 25, 1910.....	\$6, 612. 50
Transferred under river and harbor act of Mar. 4, 1915.....	6, 612. 50

2. DELAWARE RIVER, N. J., LALOR STREET, TRENTON, TO UPPER RAILROAD BRIDGE.

Work under contract dated April 24, 1914, with Eugene Breyman for dredging, including removal of bowlders, was continued throughout the year, except during the period from December 11, 1915, to March 23, 1916, when work was suspended on account of adverse weather conditions. The progress made by the contractor has been slow, due principally to the refractory nature of the material to be dredged and to the encountering of ledge rock. Considerable delay was occasioned also by freshets early in the working season of 1916.

During the progress of dredging in the east half of the channel a small area of ledge rock was encountered about 1,800 feet above Lalor Street over which there was a minimum depth at mean low water of 8.4 feet. About 2,900 feet above Lalor Street another ledge of rock was encountered with an insufficient depth of water over it to float the dredges. The dredges were able, however, to work around this ledge by excavating a cut in the west half of the channel and continued dredging in the east half of the channel above this ledge for a distance of about 300 feet, until further progress was stopped by another ledge extending clear across the channel. Although it was desired to complete the east half of the channel first, dredging was then commenced on the west half, at the lower end of the work, in order to keep the contractor's plant busy. The U. S. derrick boat *Rattler* was employed between September 24 and December 9, 1915, in making borings with a view to determine the amount of rock removal required, and a small portion of one ledge was removed by the *Rattler*. It was necessary to suspend operations for the winter before a sufficient number of borings had been made to determine accurately the limits of the area in which rock exists above grade, but sufficient information was obtained to indicate that the work of rock removal required is too extensive to be done by available Government plant without unduly delaying the contractor in his dredging operations. A supplemental agreement with the contractor, providing for the removal of all ledge rock encountered within the limits of the channel at the unit price of \$21.50 per cubic yard was entered into April 26, 1916. A drill boat was fitted up by the contractor during May and June, and at the end of the year preparations were being made to commence rock excavation.

Operations during the year resulted in the removal from within the specified limits of 226,417 cubic yards of dredged material and 31.57 cubic yards of bowlders. The dredged material consisted of about 15 per cent sand, 30 per cent clay, 50 per cent gravel, and 5 per cent cobbles. Approximately 67,000 cubic yards of material was deposited ashore on city property at the lower end of Trenton and the remainder in basins excavated by sand-dredging machines several miles below the work. The total quantity of dredged material removed to the end of the fiscal year was 311,286 cubic yards and the total quantity of bowlders removed was 63 cubic yards. The unit price for dredging is 38 cents per cubic yard, scow measurement, and the unit price for removal of bowlders is \$1 per cubic yard, place measurement. Expenditures were as follows:

Channel excavation under contract.....	\$88,668.20
Removal of bowlders under contract.....	32.00
Examination of rock area with Government plant.....	3,624.28
Superintendence and inspection, office expenses, and incidentals.....	5,635.57
Total.....	97,960.05

APPROPRIATIONS.

July 25, 1912.....	\$50,000.00
Mar. 4, 1913.....	114,000.00
Mar. 4, 1915.....	6,612.50
July 27, 1916.....	40,000.00
Total.....	210,612.50

CONTRACT IN FORCE.

Name of contractor: Eugene Breymann, of Toledo, Ohio.

Amount and character of work: Dredging, 517,500 cubic yards; removal of bowlders, 500 cubic yards; removal of ledge rock, 4,000 cubic yards.

Price per unit: Dredging, 38 cents; removal of bowlders, \$1; removal of ledge rock, \$21.50.

Date of approval: May 6, 1914.

Date of beginning work: July 8, 1914.

Date of expiration: August 8, 1917.

Completed at end of fiscal year: 39 per cent.

3. DELAWARE RIVER, PA., AND N. J., PHILADELPHIA, PA., TO TRENTON, N. J.

Maintenance dredging was in progress from October 6 to November 13, 1915. Approximately 15,470 cubic yards of material were removed during this period, of which 7,110 cubic yards were removed from a shoal at the extreme upper end of the improvement, near Lalor Street, Trenton, 4,740 cubic yards from Lehigh range and 3,620 cubic yards from Van Sciver range. The plant used for this work consisted of the dipper dredge *Newburgh* and one scow, hired from Eugene Breymann, of Boston, Mass., tended by the U. S. tug *Camden*. The dredge and scow were hired for a total of 32 days, at the price of \$122 per day, being employed on maintenance dredging at such times as they were delayed pending the removal by United States plant of ledge rock encountered during work under Mr. Breymann's contract of April 24, 1914, for dredging at Trenton, above Lalor Street. The unit cost of the maintenance dredging, including the services of the tug *Camden*, was approximately 31.4 cents per cubic yard. No contract work was in progress during the year. A complete examination of the channel was made during the latter part of June, 1916. Considerable shoaling has occurred during the past year, and it is estimated that the removal of about 160,000 cubic yards of material will be required to restore the channel to the project dimensions. Expenditures during the year on account of maintenance work, channel examinations, and incidentals amounted to \$5,690.59.

APPROPRIATIONS.

Prior to present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 443)		\$201, 000. 00
Present project:		
June 25, 1910	\$100, 000. 00	
Mar. 4, 1911	160, 000. 00	
Aug. 24, 1912	70, 000. 00	
Mar. 4, 1913	20, 000. 00	
July 27, 1916	25, 000. 00	
		875, 000. 00
Total of appropriations		576, 000. 00
Amount carried to surplus fund of Treasury		3, 376. 75
Net total		572, 623. 25
Received from sales		16. 04
Grand total		572, 639. 29

¹ Of this amount the sum of \$124,500 appropriated for the improvement of the Delaware River from Trenton to its mouth was expended on this part of the river prior to adoption of the existing project.

COMMERCIAL STATISTICS.

Season of navigation, year 1915, open March 1, closed January 15, 1916.

Vessel classification.

Class.	American.		Total.		Passen- gers.
	Arrivals.	Departures.	Number.	Tonnage.	
Steamers.....	1,528	1,526	3,052	305,200	167,500
Sailing vessels.....	85	85	170	38,500	.....
Barges.....	3,201	3,201	6,402	1,240,400	.....
Canal boats (coal boxes).....	2,624	2,624	5,248	367,360	.....
Total.....	7,436	7,436	14,872	1,951,460	167,500

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance freight was carried.	Rate per ton- mile.
Bricks.....	10,474,000.....	26,185	\$84,276	7.0	\$0.0053
Canned goods.....	13,000 cases.....	510	38,500	12.0	.0810
Chemicals.....	3,250 tons.....	3,250	62,963	4.0	.0623
Clay.....	8,102 tons.....	8,102	8,844	12.0	.0192
Coal.....	230,051 tons.....	230,051	915,704	19.2	.0190
Coke.....	11,226 tons.....	11,226	31,022	6.4	.0290
Dairy products.....	160,000 pounds.....	80	40,000	12.0	.0132
Fertilizer.....	5,000 tons.....	5,000	10,000	22.4	.0231
General merchandise.....	63,747 tons.....	63,747	10,049,772	24.1	.0671
Hay.....	3,334 tons.....	3,334	32,572	62.3	.0219
Iron pipe and specials.....	39,839 tons.....	39,839	810,357	96.2	.0112
Iron, pig.....	25,522 tons.....	25,522	348,165	110.4	.0074
Lumber.....	1,550,000 feet b. m.....	3,000	90,000	12.0	.0112
Manure.....	7,200 tons.....	7,200	14,400	50.2	.0131
Ore.....	20,000 tons.....	20,000	180,000	13.4	.0234
Sand and gravel.....	1,032,276 cubic yards.....	1,290,345	618,632	26.0	.0049
Miscellaneous.....	45,031 tons.....	45,031	2,861,572	25.2	.0521
Total.....	.....	1,782,422	16,196,779	.....	.....

¹ Of this quantity 1,112,437 tons was dredged from the river by sand dredging companies and transported in barges to Philadelphia and other points for building purposes.

4. DELAWARE RIVER, PA., N. J., AND DEL., PHILADELPHIA, PA., TO
"THE SEA."

I. WORK OF IMPROVEMENT.

Dredging.—Original dredging under contract was in progress throughout the year, except between January 17 and March 24, 1916, when adverse weather conditions prevailed. Of the five contracts in force at the beginning of the year four were completed and one was annulled. Work was commenced under two new contracts, one of which is nearing completion. The quantity of material removed during the year was approximately 3,248,000 cubic yards. A list of all contracts in force during the year is appended.

Dredging on the lower end of Mifflin, connecting, and upper end of Tinicum lighthouse ranges, about 12 miles below Philadelphia, under contract of December 18, 1912, with the Atlantic Dredging Co., of Philadelphia, Pa., was continued until December 15, 1915, when

work was suspended on account of unfavorable weather conditions. Progress under this contract has been very unsatisfactory from the first, due principally to the inadequacy of the contractor's plant, which was unable to handle at the required rate even the comparatively soft material encountered during the first two working seasons. This difficulty became more apparent when somewhat harder material, consisting of compacted sand and gravel, with a small percentage of cobbles, was encountered at the upper end of the section of channel covered by this contract near the close of the second working season. The hydraulic dredges of the contractor were unable to rehandle and place this material ashore above high water, as required by the contract. A supplemental agreement, dated May 4, 1915, provides that such material may be deposited at certain designated localities in the Delaware River, without rehandling, at a reduction of 2 cents per cubic yard in the price of the work.

At the beginning of the working season in 1916 the contractor refused to proceed with the work except under a supplemental contract providing for increased compensation, on account of alleged hard material encountered, and the contract was annulled March 30, 1916. The contractor has brought suit against the United States in the Court of Claims (No. 33240) for payment of \$545,121.72, claiming that this amount represents the actual cost of the work, less the sums already paid to the claimant under the contract. Preliminary hearings in this suit were in progress at the close of the fiscal year. The net quantity of material removed during the fiscal year under this contract was 235,379 cubic yards, of which 99,805 cubic yards were deposited on shore above high water, at a unit price of 12.99 cents per cubic yard, and 135,574 cubic yards were deposited in the Delaware River above Chester Island Dike, at a unit price of 10.99 cents per cubic yard. The total net quantity of material removed under the contract was 1,360,602 cubic yards, of which 1,160,112 cubic yards were deposited on shore above high water and 200,490 cubic yards were deposited in the Delaware River above Chester Island Dike. It is estimated that the removal of approximately 350,000 cubic yards of material will be required to complete the work. The contract was, therefore, approximately 80 per cent completed when annulled. It is proposed to complete this section of the channel under contract after advertisement in the usual manner. Proposals for this work will be opened July 14, 1916.

Dredging on the upper section of Marcus Hook range, about 20 miles below Philadelphia, under contract of July 14, 1913, with the American Dredging Co., of Philadelphia, Pa., was completed at the beginning of the fiscal year, except in the immediate vicinity of a small area of ledge rock, which had been encountered during the progress of the work, and the removal of which was not required under the contract. During July and August examinations by sweeping and probing were made to determine the location and extent of the loose material lying over and around the ledge of rock and projecting above the plane of 35 feet below mean low water. The removal of this material, amounting to 9,172 cubic yards, was completed September 28, 1915. The total net quantity of material removed under the contract was 2,484,642 cubic yards. The unit price was 9.4 cents per cubic yard, scow measurement. Work under this con-

tract resulted in the completion of a channel of the project dimensions, except at the rock area, for a length of about 2.5 miles.

Dredging on the lower section of Chester Lighthouse range, about 18 miles below Philadelphia, under contract of July 15, 1913, with the Coastwise Dredging Co., of Norfolk, Va., which was interrupted March 30, 1915, by the sinking of the dredge *Weymouth*, was resumed July 30, 1915, with the dredge *Gov. Herrick*, and was completed September 18, 1915. The net quantity of material removed during the year was 37,306 cubic yards, and the total net quantity removed under the contract was 1,809,342 cubic yards. The unit price was 9 cents per cubic yard, scow measurement. The ledge of rock encountered on the upper section of Marcus Hook range extends into the lower section of Chester range, so that it was impossible to make project depth over the entire area covered by this contract. Except at the rock area, the channel was completed to project dimensions for a length of about 1 mile.

Dredging in the lower end of Philadelphia Harbor was continued under contract of December 16, 1913, with the Maryland Dredging & Contracting Co., of Baltimore, Md., and completed August 12, 1915. The net quantity of material removed during the year was 185,469 cubic yards, and the total net quantity removed under the contract was 1,798,322 cubic yards. The unit price was 14.7 cents per cubic yard. Work under this contract resulted in the completion of a channel of the project depth and a width of 500 feet, or one-half the projected width of the channel along the Philadelphia water front for a distance of about 2 miles.

Dredging on Bellevue Lighthouse range, about 25 miles below Philadelphia, under contract of January 21, 1915, with the American Dredging Co., of Philadelphia, Pa., was completed at the beginning of the fiscal year, except for the removal of a few small shoals. These were removed and the contract completed on July 1, 1915, 4,503 cubic yards of material being dredged on that date. The total net quantity of material removed under the contract was 2,307,204 cubic yards, at a unit price of 8.3 cents per cubic yard. Work under this contract resulted in the completion of a channel of the project dimensions for a length of about 2.1 miles.

Dredging in the upper end of Philadelphia Harbor, opposite Port Richmond, under contract dated June 30, 1915, with the Maryland Dredging & Contracting Co., of Baltimore, Md., was commenced September 1, 1915. At the end of the fiscal year the entire area covered by the contract had been dredged to the project depth, but considerable shoaling had occurred in the portions first completed. A sweep survey, to determine the extent of this shoaling and to determine whether any shoal lumps existed between lines of soundings was in progress at the close of the year. The net quantity of material excavated during the year was 775,911 cubic yards, at a unit price of 24.9 cents per cubic yard. Supplemental agreements entered into October 5, 1915, and May 26, 1916, provide for depositing the heavier material dredged under this contract in embankments at Edgemoor bulkhead, a portion of it to be dumped into place from scows at a unit price of 10 cents per cubic yard additional, and the remainder to be dumped and placed in the embankment by rehandling, at a unit price of 23 cents per cubic yard additional, the total considera-

tion for this additional work to be approximately \$43,000. The second supplemental agreement also provides that suitable material from other sources may be used in this work provided the contractor is not able to secure sufficient suitable material in the prosecution of work under his original contract. The quantity of material deposited in the bulkhead under the supplemental agreements was 198,449 cubic yards.

Dredging under contract of January 28, 1916, with the American Dredging Co., of Philadelphia, Pa., for work on Bellevue Lighthouse range, about 27 miles below Philadelphia, and on Cherry Island and Deep Water Point Lighthouse ranges, about 32 miles below Philadelphia, was commenced March 31, 1916. The upper section of the work for a length of 4,000 feet on Bellevue range, involving the removal of a net quantity of 735,282 cubic yards of material, was completed June 8, 1916. The total net quantity of material removed during the year was 2,000,606 cubic yards. The unit price is 9.2 cents per cubic yard. At the end of the year, the contract was approximately 57 per cent completed.

Dikes.—Work was continued by the Coast & Lakes Contracting Corporation of New York, N. Y., under contract dated July 11, 1914, for completion of the dike work commenced by the Breakwater Co. under contract of February 23, 1912, which contract was annulled July 1, 1914. This present contract provides for the construction of four all-stone type of dikes, located respectively at Chester Island, Old Man Point, lower end of Artificial Island, and lower end of Reedy Island and the topping off with stone of the old Reedy Island Dike. The dike at Chester Island was completed January 27, 1915, the dike at Old Man Point was completed September 3, 1915, and the dike at lower end of Artificial Island is completed except for portions which were damaged during storms on August 3 and 4 and November 18, 1915, and which have not yet been rebuilt. Work under this contract was in progress until December 16, 1915, when operations were suspended on account of unfavorable weather conditions. Work was resumed May 1, 1916. The quantity of stone placed during the year was as follows: Riprap, 15,939 tons; rubble, 27,092 tons. The total quantity placed under the contract to the end of the fiscal year was: Riprap, 61,071 tons; rubble, 62,197 tons. At the end of the year the contract was approximately 52 per cent completed.

Under contract dated July 22, 1915, with the Coast & Lakes Contracting Corporation, a riprap revetment was placed along the channel face of the bulkhead of the lower basin at Artificial Island for a distance of about 6,500 feet in order to strengthen the bulkhead preparatory to depositing additional material from maintenance dredging. The work was commenced July 21 and completed September 20, 1915. The quantity of stone placed under this contract was 12,000 tons at a unit price of \$1.39 per ton.

Work under contract dated November 5, 1915, with the Coast & Lakes Contracting Corporation for furnishing and placing riprap at Mifflin Bar Dike was commenced December 1, 1915. Only one barge load of stone was placed between that date and December 22, 1915, when work was suspended for the winter. Operations were resumed March 27, 1916. The work contemplated under this con-

tract is the building up of the present low-water dike to form an embankment 8 feet wide at an elevation of 8 feet above mean low water with side slopes of 1 on 1, for an aggregate length of about 2,100 feet, with dike heads 20 feet square on top at each side of the 400-foot gap in the present low-water dike. During the fiscal year 17,533 tons of riprap were placed under this contract at a unit price of \$1.36 per ton. A length of 970 feet, including the two-dike heads, was completed and an additional length of about 225 feet was under construction at the close of the year. The contract is approximately 49 per cent completed.

Edgemoor bulkhead.—The approved project provides for the extension of the bulkhead at Edgemoor, Del., to connect with the jetty on the north side of Christiana River, its purpose being primarily to assist in the maintenance of the channel at this point; and, secondarily, to provide an inclosed basin for the reception of material dredged from the channel. The present timber bulkhead is in a dilapidated condition and not sufficiently strong to retain a mud fill. The work of strengthening the timber bulkhead with embankments of heavy dredged material, building an embankment in extension of the present bulkhead, and building a cross embankment from the lower end of the present bulkhead to the upper side of the mouth of Shellpot Creek, to form an inclosed basin for immediate use, were authorized by the Chief of Engineers October 4 and commenced October 14, 1915. The cross embankment is intended later to form one side of the channel to provide drainage for Shellpot Creek when the basin between the Edgemoor bulkhead extension and the Christiana River jetty shall have been inclosed.

At the end of the year there had been deposited at this locality approximately 276,000 cubic yards of heavy dredged material consisting of gravel, sand, and clay, of which 198,449 cubic yards were dredged from Philadelphia Harbor and deposited at Edgemoor bulkhead under contract with the Maryland Dredging & Contracting Co. dated June 30, 1915, and supplemental agreements of October 5, 1915, and May 26, 1916. The remainder was dredged from other localities in connection with the construction of wharves under permits and was deposited in the embankments at Edgemoor without cost to the United States, other than the expense of superintendence and inspection. This work resulted in the completion of the reinforcing embankment along the old bulkhead to an average height of about 5 feet above mean low water for about 2,000 feet of the length of the bulkhead, and the completion of the base of the bank in extension of the bulkhead to an average elevation of about 10 feet below mean low water for a length of about 2,000 feet. Approximately 29,000 cubic yards of material were placed in the cross embankment between the end of the timber bulkhead and the mouth of Shellpot Creek, but on account of the extreme softness of the bottom practically all of this material settled into the mud and it is probable that some other form of construction will have to be adopted.

Work by Government plant.—Government plant was employed during May and June, 1916, in making test probings over the areas of ledge rock within the channel limits, near the intersection of Chester and Marcus Hook Lighthouse ranges, with a view to determining the amount of rock excavation that will be necessary in order to

secure a depth of 35 feet at mean low water. This work had not been completed at the end of the year.

II. MAINTENANCE OF IMPROVEMENT.

Dredging.—Maintenance work with the United States suction dredges *Delaware* and *Manhattan*, supplemented by the United States hydraulic dredge *Cataract* and attendant plant, was in progress throughout the year, except during about two months in the winter, when the plant was unable to work owing to adverse weather conditions. During the period of enforced idleness the plant was overhauled and placed in serviceable condition for the working year of 1916. The quantity of material removed in maintaining the channel was approximately 9,461,000 cubic yards, of which 2,160,000 cubic yards were placed on shore above high water or deposited in an inclosed basin, and 7,301,000 cubic yards were pumped overboard on ebb tide and carried in solution into deep water in the lower bay. The pumping overboard of very soft material is a well-recognized method of maintaining channels of waterways, and the method is fully described in the Annual Report of the Chief of Engineers for 1913, page 1746.

Maintenance dredging so far has generally been confined to maintaining a 30-foot depth in the portions of the channel which have not been dredged under contract to the project depth of 35 feet. The original 30-foot channel was completed to a width of 600 feet. It has ordinarily required the entire capacity of the present Government plant to maintain the 30-foot channel over a bottom width of only about 200 feet, making it necessary to postpone maintenance operations on the completed portions of the 35-foot channel.

Considering the rate at which appropriations are now being made for this project, it is quite probable that a great portion of the earliest completed sections of the 35-foot channel will have shoaled to 30 feet or less before the completion of the last sections. In some portions of the river shoaling takes place very rapidly, particularly on Marcus Hook, Bellevue, Cherry Island, Deep Water Point, New Castle, and Liston Lighthouse Ranges.

It is expected that the dikes already completed and proposed to be built under the project will aid in maintaining the channel depth, and it may be found that the construction of additional dikes will be advisable. It is believed, however, in view of the difficulty experienced in maintaining even a 30-foot depth over a comparatively narrow strip along the center of the old channel, that the present plant will be totally inadequate to provide for maintenance of a 35-foot depth over the entire length of the improvement, with the works now projected.

The cost of dredging with these Government dredges is much less than the cost of dredging by contract. Considering, therefore, the necessity of an adequate maintenance plant, the value of Government dredges on the work, both for maintenance and original dredging, the impracticability of carrying on maintenance work by contract, and the rate at which appropriations are now being made for this project, it is advisable to purchase additional dredging plant for use in this district as early as funds can be secured for the purpose.

Repairs to plant.—The dredges *Delaware* and *Manhattan* were overhauled at the Philadelphia Navy Yard during the period when operations were suspended during the winter. The other portions of the active floating plant were overhauled and repaired at the Government wharf at Marcus Hook, Pa., and at local shipyards. So far as possible all repairs were made by the crews of the vessels.

Wharf construction.—The construction of two wharves and a bulkhead of timber and concrete at Fort Mifflin, Pa., under contract with the Armstrong & Latta Co., of Philadelphia, Pa., was in progress until January 29, 1916, when work was suspended for the winter. Work was resumed March 6 and completed May 26, 1916. A description of the wharves and bulkhead may be found in the Annual Report of the Chief of Engineers for 1915, page 2202.

Cutter "Mifflin."—The construction of the gasoline cutter *Mifflin*, under contract of March 11, 1915, with the Mathis Yacht Building Co., was continued. The work was considerably delayed, due principally to the fact that the propelling engines first furnished were not satisfactory and others of a different make had to be substituted. The boat was launched December 1, 1915, and a trial run was made February 11, 1916, with satisfactory results. Alterations in the heating system and other details were made, and the boat was accepted as complete on March 1, 1916, subject to the 30-day trial. Other minor defects were found during the trial period and corrected.

III. MISCELLANEOUS WORK.

Repairs were made to the bulkhead bar jetty by the U. S. derrick boat *Rattler* and crew during July, 1915, 500 tons of riprap stone being used in this work, at a cost of 90 cents per ton delivered to Government towboat on quarry scows. The riprap revetment of the river bank at Fort Mifflin, Pa., was repaired by Government plant during July and August, 1915, using 200 tons of one-man and two-man stone, at a cost of \$1.15 per ton, delivered on quarry scows. Government plant was also employed in making minor repairs to the old wharf at Fort Mifflin, to the Government wharf at Marcus Hook, Pa., and to sextant signals along the river and in removing obstructions from the river.

Harbor lines.—Harbor lines, extending from the mouth of the Schuylkill River to Greenwich Point, on the Pennsylvania shore, and from Red Bank to Newton Creek on the New Jersey shore, were approved by the Secretary of War on September 21, 1915, to supersede harbor lines for these localities established September 4, 1908.

A new map of harbor lines in front of Camden, N. J., from Newton Creek to Cooper Point, established March 18, 1914, embodying certain corrections to map of that date and including the combined pierhead and bulkhead lines established February 7, 1911, from Cooper Point to Cooper Creek, was approved by the Secretary of War June 26, 1916.

The harbor lines from Edgemoor, Del., to Christiana River, established November 7, 1902, were abrogated by the Secretary of War June 28, 1916.

At the end of the fiscal year a modification of the harbor lines established October 30, 1913, in the vicinity of Chester, Pa., between Crum and Ridley Creeks, was under consideration.

IV. EXPENDITURES.

A statement of the total amount expended during the year, and the amounts expended for the various items of work described above, is shown in the following tabulation:

Items.	New work.	Maintenance.	Total.
Original dredging, under contract.....	\$496,508.72		\$496,508.72
Stone dike construction, under contract.....	81,675.43		81,675.43
Repairs and extension of Edgemoor bulkhead, under contract.....	21,180.96		21,180.96
Operation and repair of floating plant used in connection with new work.....	7,703.22		7,703.22
Purchase of automatic tide gauges.....	833.00		833.00
Test probing in rock areas below Philadelphia.....	1,253.04		1,253.04
Test dredging below Philadelphia.....	1,500.00		1,500.00
Maintenance dredging with Government plant, including repair of plant.....		\$216,240.12	216,240.12
Repairs of regulating works, Government wharves, etc., and miscellaneous maintenance work.....		1,779.25	1,779.25
Pier and bulkhead construction, under contract.....		133,682.12	133,682.12
Construction of survey boat.....		19,912.00	19,912.00
Surveys and incidentals.....	7,253.18	18,341.67	25,594.85
Care of property.....		2,550.00	2,550.00
Engineering and contingencies, superintendence and inspection, office expenses and incidentals.....	38,902.04	48,992.39	87,894.43
Total.....	656,709.58	441,497.55	1,098,207.13

V. IMPROVEMENT OF WATER TERMINAL AND OTHER FACILITIES AT THE PORT OF PHILADELPHIA.

At the request of the district officer, Mr. George S. Webster, director of the department of wharves, docks, and ferries, city of Philadelphia, furnished the following information relative to operations carried on and in contemplation by the city of Philadelphia during the fiscal year ended June 30, 1916:

In general.—Much progress has been made by the municipality in equipping the port of Philadelphia with additional wharfage accommodations. The department expended or placed under contract during the year aggregating in value approximately \$1,996,000. Additional funds to the amount of approximately \$13,400,000 are now available for the improvement of the port. The amount expended during the year by private interests on the improvement of water-terminal facilities at the port was approximately \$251,000.

New piers.—Two large steel and concrete piers in the Delaware River, in the lower section of the harbor, were completed October 16, 1915. These piers are 180 feet wide by 500 feet long and equipped with up-to-date electrically operated freight-handling machinery. The cost of the two piers was approximately \$1,850,000.

Plans and specifications for a third modern steel and concrete pier, 180 feet by 550 feet, to be constructed in the lower section of the Delaware River front, at the foot of Kenilworth Street, are now in the course of preparation. This pier will cost approximately \$1,000,000.

Preparation is being made by the city for the erection of 10 modern steel and concrete piers, to be known as the Moyamensing pier group, in the lower section of the Delaware River front in the vicinity of Greenwich Point. The dimensions of these piers will vary from 250 by 900 feet to 300 by 1,200 feet. One of these piers, located just above Greenwich Point, is now under construction and was about 30 per cent completed at the end of the fiscal year. Plans and specifications are being prepared for the construction of two additional piers of the Moyamensing pier group, the estimated cost of which is \$3,300,000 each. It is estimated that when the 10 piers are completed they will be capable of handling at least 4,000,000 tons of freight per annum. It is estimated that the Moyamensing pier group will cost upward of \$15,000,000 to complete and will give the port of Philadelphia a water terminal that is not excelled at any port on the Atlantic seaboard.

The city also has in contemplation the construction during the next fiscal year of a modern steel and concrete pier 100 feet wide by 535 feet long in the upper section of the Delaware River front for the use of steamboats and other river craft.

The city now has available \$750,000 for completing the work of bulkheading the Schuylkill River.

The dredging plant owned by the city has been employed during the year in dredging out city-owned docks and docks into which municipal sewers empty and in widening and deepening the channel of the Schuylkill River.

The city is now engaged in dredging a channel 500 feet wide and 30 feet deep within the limits of the main ship channel in the Delaware River between Susquehanna Avenue and Cambria Street, Philadelphia, a length of about 1 mile.

VI. NEW INDUSTRIES ON THE DELAWARE RIVER.

The construction of two large shipbuilding plants below Philadelphia and the extension of the facilities of existing shipbuilding plants was commenced and carried to various stages of completion during the year; the construction of two large oil refineries and a large chemical plant was also commenced; a very large ordnance plant was completed and placed in operation at Eddystone during the year; facilities for the manufacture of explosives at several points on the river were greatly increased and extended during the year; ground was purchased and preliminary plans were made during the year for the erection of two very large industrial plants in the vicinity of Chester and Marcus Hook, each of which expects to employ about 15,000 men. The completion of industrial plants now proposed or in contemplation will greatly increase the importance of the Delaware River as an industrial center and make Philadelphia and vicinity one of the largest manufacturing districts in the world.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 442)-----¹\$9,794,948.71

Present project:

June 25, 1910-----	\$800,000.00	
Feb. 27, 1911-----	800,000.00	
July 25, 1912-----	1,300,000.00	
Aug. 24, 1912-----	450,000.00	
Mar. 4, 1913-----	1,750,000.00	
June 23, 1913-----	250,000.00	
Oct. 2, 1914 (allotment Oct. 7, 1914)-----	1,000,000.00	
Mar. 4, 1915 (allotment Apr. 2, 1915)-----	1,000,000.00	
July 27, 1916-----	2,100,000.00	
		9,450,000.00
Total-----		19,244,948.71

PHILADELPHIA HARBOR.

Total to Mar. 3, 1905 (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 443)-----	\$3,950,000.00	
Amount carried to surplus fund of the Treasury--	4,575.25	
		3,945,424.75

Net total of appropriations-----		23,190,373.46
Amount received from other sources, previously reported-----	\$32,263.43	
Amount received during the fiscal year on account of sales-----	64.18	
		32,327.61
Grand total-----		23,222,701.07

¹ In addition to this amount \$124,500 was expended on that part of the Delaware River between Philadelphia and Trenton prior to adoption of existing project.

CONTRACTS IN FORCE.

DREDGING.

Contractor: Atlantic Dredging Co., of Philadelphia.

Date of contract: December 18, 1912.

Contract annulled: March 30, 1916.

Contractor: Coastwise Dredging Co., of Norfolk, Va.

Approximate yardage: 1,575,000; unit price, 9 cents.

Date of contract: July 15, 1913.

Date of approval: August 12, 1913.

Date of beginning work: August 29, 1913.

Rate of progress required: 125,000 cubic yards per month.

Date of completion of contract: September 18, 1915.

Contractor: Maryland Dredging & Contracting Co., of Baltimore, Md.

Approximate yardage: 1,700,000; unit price, 14.7 cents.

Date of contract: December 16, 1913.

Date of approval: December 23, 1913.

Date of beginning work: May 25, 1914.

Rate of progress required: 50,000 cubic yards per month during the first two months and 125,000 cubic yards per month thereafter.

Date of completion of contract: August 12, 1915.

Contractor: American Dredging Co., of Philadelphia.

Approximate yardage: 2,525,000; unit price, 8.3 cents.

Date of contract: January 21, 1915.

Date of approval: January 29, 1915.

Date of beginning work: March 6, 1915.

Date fixed for completion of the work: July 17, 1916.

Date of actual completion of the work: July 1, 1915.

Contractor: Maryland Dredging & Contracting Co., of Baltimore, Md.

Approximate yardage: 800,000; unit price, 24.9 cents.

Date of contract: June 30, 1915.

Date of approval: July 7, 1915.

Date of beginning work: September 1, 1915.

Date fixed for completion of the work: November 15, 1916.

Contractor: American Dredging Co., of Philadelphia.

Approximate yardage: 3,580,000; unit price, 9.2 cents.

Date of contract: January 28, 1916.

Date of approval: February 2, 1916.

Date of beginning work: March 31, 1916.

Rate of progress required: 900,000 cubic yards per month.

DIKE CONSTRUCTION.

Contractor: Coast & Lakes Contracting Corporation, of New York City.

Approximate quantity: 135,990 tons of stone; unit price, \$1.16 to \$1.65 per ton.

Date of contract: July 11, 1914.

Date of approval: July 20, 1914.

Date fixed for commencement of work: September 23, 1914.

Date of actual commencement of work: August 4, 1914.

Date fixed for completion of the work: July 23, 1915.

Contractor: Coast & Lakes Contracting Corporation, of New York City.

Approximate quantity: 12,000 tons of stone, unit price, \$1.39 per ton.

Date of contract: July 22, 1915.

Date of approval: August 4, 1915.

Date fixed for commencement of work: October 6, 1915.

Date of actual commencement of work: July 21, 1915.

Date fixed for completion of the work: December 7, 1915.

Date of actual completion of the work: September 20, 1915.

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Contractor: Coast & Lakes Contracting Corporation, of New York City.
 Approximate quantity: 36,000 tons of stone; unit price, \$1.36 per ton.
 Date of contract: November 5, 1915.
 Date of approval: November 17, 1915.
 Date fixed for commencement of work: March 15, 1916.
 Date of actual commencement of work: December 1, 1915.
 Date fixed for completion of the work: October 3, 1916.

PIERS AND BULKHEAD AT FORT MIFFLIN, PA.

Contractor: Armstrong & Latta Co., of Philadelphia.
 Estimated consideration: \$158,822.
 Date of contract: October 19, 1914.
 Date of approval: October 31, 1914.
 Date fixed for commencement of work: January 2, 1915.
 Date of actual commencement of work: December 4, 1914.
 Date fixed for completion of the work: March 3, 1916.
 Date of actual completion of the work: May 26, 1916.

CONSTRUCTION OF GASOLINE SURVEY CUTTER "MIFFLIN."

Contractor: Mathias Yacht Building Co., of Camden, N. J.
 Consideration of contract: \$20,072.
 Date of contract: March 11, 1915.
 Date of approval: March 26, 1915.
 Date fixed for commencement of work: April 8, 1915.
 Date of actual commencement of work: April 5, 1915.
 Date fixed for completion of the work: June 27, 1915.
 Date of actual completion of the work: March 1, 1916.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, closed December 31.

Vessel classification.

Description.	Foreign.		Domestic and coastwise.		Total.		Passengers.
	Entered.	Cleared.	Arrivals.	Departures.	Number.	Net tonnage.	
American:							
Steam vessels.....	84	79	.....	.....	163	414,469	12,500
Sailing vessels.....	76	81	.....	.....	157	106,888	.....
Foreign:							
Steam vessels.....	865	843	.....	.....	1,708	3,455,413	10,150
Sailing vessels.....	52	48	.....	.....	100	114,890	.....
Steamers.....	.....	.....	¹ 10,120	¹ 10,120	20,240	7,326,890	2,566,242
Sailing vessels.....	.....	.....	² 28,150	² 28,150	52,300	5,805,300	.....
Canal boats and barges.....	.....	.....	³ 30,100	³ 30,100	60,200	6,982,300	.....
Total.....	1,077	1,051	68,370	66,370	134,868	24,210,940	2,588,892

¹ Exclusive of tugboats and ferryboats.

² Including 14,500 oyster boats (estimated).

³ Including 13,200 railroad lighters (estimated).

Freight traffic.
FOREIGN COMMERCE.

Articles.	Amount in customary units.	Amount in short tons.	Value.
IMPORTS.			
Asphaltum, crude.....	3,818 tons.....	3,818	\$17,116
Bananas.....	3,024,062 bunches.....	37,801	968,584
Other fruits.....	3,219,329 pounds.....	1,610	188,876
Bone dust.....	3,676 tons.....	3,676	101,086
Burlap.....	37,296,964 pounds.....	13,648	1,913,039
Chalk.....	26,963 tons.....	26,963	19,814
Clay, china and common.....	85,815 tons.....	85,815	455,337
Cotton.....	1,723,864 pounds.....	862	230,294
Cotton waste.....	1,454,865 pounds.....	737	78,344
Cotton fabrics.....	1,079,463 pounds.....	540	177,274
Cotton manufactures.....	1,067,613 pounds.....	544	624,596
Drugs and chemicals.....	38,377,968 pounds.....	19,189	2,610,563
Dyewood.....	4,133 tons.....	4,133	72,382
Fertilizer.....	3,334 tons.....	3,334	108,139
Fish.....	5,922,677 pounds.....	2,962	355,670
Flour, rice.....	3,681,300 pounds.....	1,841	73,239
Fluorspar.....	4,541 tons.....	4,541	15,783
Groceries, provisions, and dairy products.....	2,996 tons.....	2,996	750,000
Hides.....	41,421 pieces.....	368	99,079
Iron and steel:			
Manufactured.....	6,956 tons.....	6,956	877,713
Pig.....	15,906 tons.....	15,906	906,712
Scrap.....	5,197 tons.....	5,197	113,726
Jute and jute butts.....	7,755 tons.....	7,755	602,710
Kainit.....	61 tons.....	61	609
Kryolith.....	82,750 tons.....	82,750	82,750
Licorice root.....	43,691,942 pounds.....	21,846	977,488
Logwood.....	27,810 tons.....	27,810	342,786
Magnesite, calcined.....	28,392,823 pounds.....	14,196	154,796
Molasses.....	15,557,073 gallons.....	7,773	421,108
Nuts.....	1,831,545 pounds.....	915	201,986
Ores:			
Iron, chromate.....	13,955 tons.....	13,955	169,779
Iron.....	667,780 tons.....	667,780	2,273,220
Manganese.....	27,321 tons.....	27,321	198,247
Sulphur.....	194,521 tons.....	194,521	1,464,750
Oils:			
Mineral.....	82,018,733 gallons.....	246,066	1,125,942
Coconut.....	5,053,727 pounds.....	2,527	396,376
Croscote.....	2,609,357 gallons.....	8,480	223,261
Olive.....	51,627 gallons.....	167	36,916
Palm.....	8,177,688 pounds.....	4,088	535,965
Sulphur.....	2,003,936 pounds.....	1,001	147,761
Other oils.....	189,736 gallons.....	68	66,000
Paper.....	665,294 pounds.....	976	66,972
Paraffin.....	2,225,951 pounds.....	1,112	104,535
Plaster.....	35,618 tons.....	35,618	45,463
Rags.....	16,739,489 pounds.....	8,370	177,841
Seeds.....	8,969,951 pounds.....	4,485	362,334
Skins:			
Goat.....	16,978,932 pieces.....	15,137	6,541,612
Sheep.....	2,683,743 pieces.....	3,891	1,299,011
Calf.....	70,144 pieces.....	231	82,596
Horse and ass.....	20,468 pieces.....	333	80,393
Soda, nitrate.....	97,348 tons.....	97,348	2,676,008
Sugar.....	604,289,675 pounds.....	302,144	20,063,850
Wines and liquors.....	189,699 gallons.....	616	339,027
Wood pulp.....	31,544 tons.....	31,544	1,255,861
Wool:			
Class No. 1.....	7,811,822 pounds.....	3,906	2,645,813
Class No. 2.....	253,370 pounds.....	126	87,898
Class No. 3.....	5,071,687 pounds.....	2,536	1,061,144
Miscellaneous.....	30,252 tons.....	30,252	12,275,128
Total.....		2,111,669	69,473,963
EXPORTS.			
Alcohol.....	436,811 gallons.....	1,310	231,771
Asphaltum.....	2,004 tons.....	2,004	42,981
Barley.....	494,088 bushels.....	14,822	359,677
Beef products.....	4,933,596 pounds.....	2,466	746,240
Cement.....	14,999 barrels.....	2,999	19,009
Chemicals and drugs.....	16,923,444 pounds.....	8,461	4,765,136
Coal:			
Bituminous.....	85,577 tons.....	85,577	401,421
Anthracite.....	1,041,838 tons.....	1,041,838	3,044,221
Coke.....	14,832 tons.....	14,832	64,166
Corn.....	1,673,568 bushels.....	56,215	1,516,061
Cornmeal.....	104,128 barrels.....	10,400	539,368

Freight traffic—Continued.
FOREIGN COMMERCE—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.
EXPORTS—continued.			
Cotton.....	10,061 bales.....	3,529	\$560,838
Cotton linters.....	3,561 bales.....	909	92,539
Feed.....	10,614,940 pounds.....	5,307	5,474,175
Glucose.....	5,594,852 pounds.....	4,237	181,356
Dynamite and gunpowder.....	22,128,552 pounds.....	11,064	18,938,623
Groceries, provisions, and dairy products.....	13,246,948 pounds.....	6,623	990,228
Iron and steel:			
Billets, ingots, and blooms.....	11,428 tons.....	11,428	259,638
Scrap.....	3,068 tons.....	3,068	30,890
Manufactured.....	84,228 tons.....	84,228	7,034,548
Pig.....	2,565 tons.....	2,565	44,176
Lard, and lard compounds.....	4,705,407 pounds.....	2,352	523,399
Lead, and manufactures of.....	4,820,028 pounds.....	2,410	168,500
Leather.....	21,038,191 pounds.....	1,019	4,300,561
Molasses and sirup.....	1,828,035 gallons.....	10,944	288,430
Oatmeal.....	12,106,823 bushels.....	338,991	338,661
Oil cake and oil-cake meal.....	24,900,187 pounds.....	12,450	389,547
Oils:			
Illuminating.....	101,779,388 gallons.....	306,338	5,415,300
Lubricating.....	51,935,306 gallons.....	105,805	5,604,446
Naphtha.....	25,502,183 gallons.....	76,506	2,938,686
Oleo.....	1,700,340 pounds.....	850	183,277
Residuum.....	1,500 gallons.....	4	100
Gas and fuel.....	22,290,508 gallons.....	67,171	729,128
Other.....	787,740 gallons.....	2,363	278,606
Paraffin and wax.....	33,483,905 pounds.....	16,741	867,744
Pipe and fittings.....	18,521,230 pounds.....	9,260	306,197
Pork products.....	10,261,467 pounds.....	5,130	1,949,493
Rosin, tar, and pitch.....	9,975 barrels.....	1,995	58,711
Rye.....	1,224,211 bushels.....	36,726	1,264,973
Soap.....	14,621,399 pounds.....	7,310	644,412
Starch.....	37,828,819 pounds.....	18,914	930,074
Sugar.....	72,490,891 pounds.....	36,245	3,322,821
Tobacco.....	5,797,795 pounds.....	2,898	696,044
Waste.....	4,414,139 pounds.....	2,207	250,731
Wheat.....	24,377,693 bushels.....	731,330	34,004,481
Wheat flour.....	914,668 barrels.....	89,637	5,965,058
Wire.....	7,371,530 pounds.....	3,685	178,506
Wood and manufactures of.....	40,772 tons.....	40,772	1,322,803
Zinc.....	7,137,459 pounds.....	3,568	899,093
Miscellaneous.....	75,550 tons.....	75,550	13,300,696
Total.....		3,382,133	132,437,556

NOTE.—The foreign commerce travels the entire length of the river and bay, 101 miles. Freight was carried an average distance of 101 miles. Impracticable to obtain rate per ton-mile on foreign commerce.

DOMESTIC AND COASTWISE COMMERCE.

Articles.	Amount in customary units.	Amount in short tons	Value.	Average distance freight was carried (miles).	Rate per ton-mile.
Asphalt.....	31,647 barrels.....	5,685	\$68,377	40.0	\$0.0795
Canned goods.....	835,491 cases.....	40,387	2,074,350	64.2	.0096
Bricks.....	220,000.....	600	28,800	69.8	.0129
Cement and lime.....	143,845 barrels.....	28,769	511,423	76.6	.0029
Chemicals.....	251,489 tons.....	251,489	5,946,655	40.1	.0134
Cinders.....	53,581 tons.....	53,581	80,369	48.2	.0045
Clay.....	21,493 tons.....	21,493	26,310	76.0	.0112
Coal.....	7,002,779 long tons.....	7,843,112	27,350,892	56.2	.0079
Coke.....	188,631 tons.....	188,631	507,635	14.8	.0129
Cotton.....	16,690 bales.....	4,924	1,280,240	101.0	.0048
Cotton (piece goods).....	53,208 pieces.....	13,302	3,392,010	28.3	.0041
Feldspar.....	21,228 tons.....	21,228	318,430	92.1	.0051
Fertilizer.....	218,350 tons.....	218,350	3,759,203	53.2	.0134
Fish oil.....	5,850 barrels.....	1,425	32,900	24.4	.0261
Flour.....	342,630 barrels.....	38,590	2,062,578	24.5	.0310
General merchandise.....	3,910,956 tons.....	3,910,956	522,731,846	24.5	.0121
Grains.....	1,668,433 bushels.....	50,963	1,261,875	85.2	.0212
Groceries and foodstuffs.....	23,390 tons.....	23,390	2,259,000	73.4	.0310
Hay and feed.....	17,144 tons.....	17,144	357,892	78.0	.0148

Freight traffic—Continued.

DOMESTIC AND COASTWISE COMMERCE—Continued.

Articles.	Amount in customary units.	Amount in short tons	Value.	Average distance freight was carried (miles).	Rate per ton-mile.
Ice.....	245,000 tons.....	245,000	\$490,000	32.4	\$0.0458
Iron and steel:					
Manufactured.....	133,834 tons.....	133,834	7,708,017	53.9	.0125
Billets.....	43,231 tons.....	43,231	1,445,145	58.2	.0799
Leather.....	10,071 tons.....	10,071	4,666,425	30.9	.0412
Liquors.....	288,500 cases.....	4,759	583,500	40.0	.0396
Lumber.....	227,235,520 feet b. m.....	454,670	6,820,050	96.5	.0031
Manure.....	130,864 tons.....	130,864	196,296	25.6	.0114
Mine props.....	101,605 tons.....	101,605	203,210	41.2	.0031
Ores.....	105,040 tons.....	105,040	634,759	25.4	.0142
Oysters and fish.....	50,020 tons.....	50,020	1,260,000	22.4	.0156
Petroleum, gasoline, and other oils.....	456,060,131 gallons.....	1,403,696	25,502,237	87.9	.0061
Produce and fruits.....	142,654 tons.....	142,654	6,166,050	42.5	.0210
Powder and explosives.....	12,202 tons.....	12,242	3,110,050	16.2	.0189
Pulp wood.....	18,984 bales.....	33,222	66,444	36.5	.0425
Railroad ties.....	879,735.....	87,937	879,730	67.4	.0042
Sand and gravel.....	1,179,159 cubic yards.....	1,473,980	712,917	32.1	.0012
Scrap fish.....	6,245 tons.....	6,245	170,282	23.4	.0116
Skins.....	25,550 bales.....	8,274	11,048,000	20.8	.0521
Stone, building.....	95,642 tons.....	95,642	191,284	26.4	.0056
Sugar.....	256,973 tons.....	256,973	24,026,465	98.3	.0033
Tar and tar oil.....	40,980,943 gallons.....	143,433	1,187,855	9.0	.0234
Turpentine and rosin.....	122,300 barrels.....	34,460	1,541,350	10.0	.0027
Wax.....	253,383 cases.....	19,017	1,141,082	7.2	.0596
Wood, cord.....	37,399 cords.....	58,719	127,238	34.2	.0194
Wool.....	17,311 tons.....	17,311	7,482,390	95.2	.0046
Miscellaneous.....	1,121,699 tons.....	1,121,699	217,000,020	35.2	.0061
Total.....		18,923,566	896,421,521		

Aggregate freight movement on the Delaware River during the calendar years 1914-15.

	1914		1915	
	Quantity.	Value.	Quantity.	Value.
Foreign:	<i>Tons.</i>		<i>Tons.</i>	
Imports.....	2,462,775	\$87,952,773	2,111,669	\$69,473,983
Exports.....	2,249,633	66,256,811	3,382,133	132,437,556
Coastwise and domestic.....	20,106,644	879,020,285	20,695,988	914,618,300
Total.....	24,817,952	1,033,229,869	26,189,790	1,116,529,839

Comparative statement of quantity and value of exports, imports, and revenue collected.

Year.	Exports.		Imports.		Revenue.
	Quantity.	Value.	Quantity.	Value.	
	<i>Tons.</i>		<i>Tons.</i>		
1906.....	3,800,995	\$88,276,315	1,732,935	\$67,913,822	\$20,505,545
1907.....	4,056,716	106,570,527	1,800,520	80,693,327	21,644,374
1908.....	3,532,472	96,833,079	1,551,015	57,407,935	16,908,929
1909.....	3,041,433	80,503,231	2,234,039	78,001,864	20,810,442
1910.....	2,532,677	65,256,949	2,948,179	89,646,337	20,883,385
1911.....	2,945,686	70,869,648	2,662,336	80,526,519	19,571,389
1912.....	2,833,436	72,789,617	3,113,336	92,560,087	21,545,507
1913.....	2,799,298	72,236,967	3,254,760	91,947,390	19,340,300
1914.....	2,249,633	66,256,811	2,462,775	87,952,773	14,839,680
1915.....	3,382,133	132,437,556	2,111,669	69,473,983	11,683,331

Vessels completed and under construction at the principal shipyards along the Delaware River during the calendar year 1916.

	Com- pleted during year.	Under construc- tion.	Gross tons.	Approx- imate value.
Battleships.....	.....	2	87,150	\$13,000,000
Torpedo destroyers.....	4	2	6,800	5,218,000
Steamers.....	3	13	58,000	10,964,000
Coasters.....	5	5	48,100	4,650,000
Tanfers.....	.....	6	16,400	1,320,000
Boats.....	3	8	5,500	220,000
Car floats.....	.....	8	6,100	410,000
Barges.....	4	10	14,000	700,000
Dredge.....	1	.....	1,200	100,000
Total.....	20	54	243,250	37,182,000

7. ICE HARBOR AT MARCUS HOOK, PA.

There were no funds available during the fiscal year for the main-tenance of this harbor.

APPROPRIATIONS.

Mar. 2, 1829.....	\$5,000
June 23, 1866.....	5,000
Mar. 2, 1867.....	94,000
June 14, 1880.....	35,000
Mar. 3, 1881.....	30,000
Aug. 2, 1882.....	15,000
Aug. 5, 1886.....	15,000
Aug. 11, 1888.....	15,000
Sept. 19, 1890.....	5,000
June 25, 1910.....	600
July 27, 1916.....	1,000
Total.....	220,600

8. CONSTRUCTING PIER IN DELAWARE BAY, NEAR LEWES, DEL.

In compliance with instructions from the Chief of Engineers a reexamination of this work was submitted under date of January 17, 1916. The report, published in House Document No. 1059, Sixty-fourth Congress, first session, presents a plan for the repair and rehabilitation of the pier, at an estimated cost of \$78,000. The cost of making the reexamination was \$50.

The cluster of fender piles protecting the northeast corner of the pierhead was damaged and partly carried away by ice and wind during a northeast gale that occurred during the early part of March, 1916. An allotment of \$350 was made for repairing the damage, and it is expected that the repairs will be completed during the early part of the next fiscal year.

Expenditures from this allotment incident to a survey of the damage amounted to \$18.48.

APPROPRIATIONS.

July 15, 1870	\$225,000.00
June 23, 1874	10,000.00
Mar. 3, 1875	25,000.00
Do.	15,000.00
Aug. 14, 1876	30,000.00
June 18, 1878	20,000.00
Mar. 3, 1879	10,500.00
June 14, 1880	10,000.00
Mar. 3, 1881	10,000.00
Aug. 2, 1882	13,000.00
Apr. 4, 1890	10,000.00
June 3, 1896	7,660.00
June 25, 1910	1,500.00
Feb. 27, 1911	1,000.00
Mar. 4, 1913 (allotment Apr. 27, 1916)	850.00
July 27, 1916	10,000.00
Total of appropriations	399,010.00
Amount carried to surplus fund of Treasury	820.60
Net total	398,189.40

7. HARBOR OF REFUGE, DELAWARE BAY, DEL.

No funds applicable to this improvement were available during the year, and it is not expected that any maintenance work will be necessary during the fiscal year ending June 30, 1918.

APPROPRIATIONS.

June 3, 1896	\$5,000.00
June 4, 1897	394,834.00
July 1, 1898	800,000.00
Mar. 3, 1899	377,000.00
June 6, 1900	450,000.00
Mar. 3, 1901	213,000.00
June 25, 1910	8,000.00
Feb. 27, 1911	8,000.00
Total of appropriations	2,255,834.00
Amount carried to surplus fund of Treasury	1,128.66
Net total	2,254,705.34

COMMERCIAL STATISTICS.

Arrivals at Delaware Breakwater during calendar year 1915.

	Steamers.	Sailing vessels.	Barges.	Total.
For orders	43	5	2	50
For harbor	102	315	668	985
In distress	3	2	2	7
Total	148	322	672	1,042

IMPROVEMENT OF RIVERS AND HARBORS IN THE WILMINGTON, DEL., DISTRICT.

REPORT OF MAJ. E. N. JOHNSTON, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Cooper River, N. J.....	2071	17. Appoquinimink, Murderkill, and Mispillion Rivers, Del.	2090
2. Woodbury Creek, N. J.....	2072	18. Smyrna River, Del.....	2094
3. Mantua Creek, N. J.....	2073	19. Leipsic River, Del.....	2095
4. Raccoon Creek, N. J.....	2074	20. Little River, Del.....	2096
5. Oldmans Creek, N. J.....	2076	21. St. Jones River, Del.....	2097
6. Salem River, N. J.....	2077	22. Broadkill River, Del.....	2098
7. Alloway Creek, N. J.....	2078	23. Inland waterway between Rehoboth Bay and Delaware Bay, Del.....	2099
8. Cohansey River, N. J.....	2079	24. Inland waterway from Chincoteague Bay, Va., to Delaware Bay at or near Lewes, Del.....	2101
9. Maurice River, N. J.....	2080	25. Improving waterway on the coast of Virginia.....	2102
10. Cold Spring Inlet, N. J.....	2082		
11. Absecon Inlet, N. J.....	2083		
12. Absecon Creek, N. J.....	2084		
13. Tuckerton Creek, N. J.....	2085		
14. Toms River, N. J.....	2086		
15. Chester River, Pa.....	2087		
16. Wilmington Harbor, Del.....	2087		

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 364 TO 418.

1. COOPER RIVER, N. J.

There were no operations during the fiscal year owing to the fact that sufficient funds were not available. The expenditures were for office expenses and inspections, amounting to \$12.49, for maintenance.

APPROPRIATIONS.

Present project:

June 3, 1896.....	¹ \$34, 500
Mar. 3, 1909 (allotted Apr. 21, 1909).....	5, 000
June 25, 1910.....	8, 000
Feb. 27, 1911.....	5, 000
July 25, 1912.....	5, 000
Mar. 4, 1913.....	5, 000
July 27, 1916.....	5, 000
Total	67, 500

¹ Of the appropriation of \$37,000, approved June 3, 1896, the sum of \$2,500 was applied to dike at mouth of Woodbury Creek, N. J.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Sand, gravel, etc.....	56,600	\$396,200
Farm produce.....	3,981	68,126
Salt hay.....	6,162	43,134
Hides.....	2,925	798,250
Coal.....	92,168	230,420
Iron and pig iron.....	16,325	411,887
Oils, gasoline, etc.....	6,222	164,645
Coke.....	5,515	16,545
Logwood.....	2,130	127,800
Pipe.....	1,201	150,000
Salt.....	950	57,000
Paving blocks.....	565	3,500
Chemicals and sulphur.....	2,646	28,990
Manure.....	3,400	244,000
Grain.....	567	300
Piling.....	5	50,000
Oysters.....	300	18,000
Tar.....	6,120	45,000
Total.....	209,692	2,840,397
Shipments:		
Gas holder material.....	110	5,500
Iron pipe.....	10,376	259,392
Cases.....	42	964
Miscellaneous finished chemical products.....	16,254	264,092
Junk, iron ore, crockery ware, machinery.....	625	36,500
Total.....	27,407	586,448
Total receipts and shipments.....	237,099	3,415,845

Vessels sailing and trading in Cooper River, N. J.

Class.	Arriving.	Departing.
Steam.....	1,232	1,232
Sailing.....	44	44
Barges and lighters.....	1,219	1,219
Total.....	2,495	2,495

The number of vessels trading in Cooper River in 1915 could not be obtained, but it is stated that the figures for 1914 are approximately correct for 1915.

2. WOODBURY CREEK, N. J.

Dredging under the contract was completed July 13, 1915. The work consisted in dredging to project dimensions 400 feet of channel not previously improved just below the fixed highway bridge at Woodbury. The work was done by contract and was all new work. The amount of material removed and redeposited upon the adjacent banks was 2,147 cubic yards, place measurement. The amount expended on the improvement during the fiscal year was, for new work \$3,370.63, and for maintenance, which covered office expenses, inspections, and thorough examination, was \$1,215.36, a total of \$4,585.99.

APPROPRIATIONS.

Previous project:		
Aug. 2, 1882	-----	\$5,000.00
June 8, 1896	-----	2,500.00
		<u>\$7,500.00</u>
Present project:		
Mar. 4, 1913	-----	38,000.00
July 27, 1916	-----	6,000.00
		<u>44,000.00</u>
Total	-----	51,500.00
Transferred under river and harbor act of Mar. 4, 1915	-----	6,000.00
		<u>45,500.00</u>
Returned to surplus fund of Treasury	-----	4,549.69
		<u>40,950.31</u>
Net total	-----	

CONTRACT IN FORCE.

Contractor: American Dredging Co., Philadelphia, Pa.
 Character and amount of work: Dredging 221,505 cubic yards.
 Unit price: 8½ cents per cubic yard, place measurement.
 Date of approval: July 2, 1914.
 Date fixed for commencement: August 8, 1914.
 Date of actual commencement: August 5, 1914.
 Date fixed for completion: August 23, 1915.
 Date of actual completion: July 13, 1915.
 Percentage of completion: 100.

COMMERCIAL STATISTICS.

It was impracticable to obtain complete commercial statistics.

3. MANTUA CREEK, N. J.

No operations were in progress during the year, as no dredging was necessary for maintenance in the portion of the improvement completed nor any repairs to the jetties, and the remaining small portion of the project is unimportant. The amount expended for office expenses and inspections during the fiscal year was \$51, for maintenance.

APPROPRIATIONS.

Previous project (amount as per H. Doc. No. 1491, 63d Cong., 2d sess., p. 482)	-----	\$3,000
Present project:		
Mar. 8, 1899	-----	\$25,000
June 13, 1902	-----	35,000
Mar. 2, 1907	-----	34,450
Mar. 3, 1909 (allotment)	-----	7,000
June 25, 1910	-----	28,000
Feb. 27, 1911	-----	6,000
July 25, 1912	-----	3,000
Mar. 4, 1913	-----	15,000
July 27, 1916	-----	10,000
		<u>163,450</u>
Total appropriations	-----	166,450

¹ Allotted from appropriation of \$37,000 for Cooper River.

2074 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Transferred under river and harbor act of Mar. 4, 1915.....	\$15,000
	151,450
Carried to surplus fund.....	200
Net appropriations.....	151,250
Receipts from sales.....	300
Grand total.....	151,550

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Hay.....	200	\$1,600.00
Coal.....	5,817	31,362.08
Building materials.....	10,325	210,625.00
Bricks.....	1,325	8,200.00
Laths.....	750	7,250.00
Manure, fish scrap, and miscellaneous fertilizers.....	75,194	561,788.01
Total.....	94,211	820,823.09
Shipments:		
Logs.....	250	800.00
Fertilizers.....	46,369	331,397.03
Farm products.....	4,522	78,300.00
Total.....	51,141	910,497.03
Total receipts and shipments.....	145,352	1,731,320.12

Vessels sailing and trading in Mantua Creek, N. J.

Class.	Number.	Draft.
Power boats.....	11	<i>Fect.</i> 5-8
Steam tugs.....	2	5
Schooners.....	2	5 1/2
Barges.....	11	4 1/2-5 1/2
Total.....	26	

There are 16 wharves on the stream, all but 3 of which are open to public use. The foregoing statistics were furnished by I. P. Thomas & Son Co., Philadelphia, Pa.; H. G. Green, Mount Royal, N. J.; and Job Scott, Mantua, N. J.

4. RACCOON CREEK, N. J.

No operations were in progress during the fiscal year. Proposals were opened for dredging on May 8, 1916, and the contract was awarded to the River & Harbor Improvement Co., the lowest bidder. Work has not been started on this contract as the plant of the contractor is engaged on other Government work in this district. The amount expended during the fiscal year for office expenses and inspections was \$543.05 for maintenance.

APPROPRIATIONS.

Previous projects (amount as per H. Doc. No. 1491, 63d Cong., 3d sess., p. 533).....	\$3,000
Present project:	
June 13, 1902.....	\$15,000
Mar. 3, 1905.....	15,000
Mar. 2, 1907.....	15,000
June 25, 1910.....	12,500
Feb. 27, 1911.....	5,000
July 25, 1912.....	4,000
Mar. 4, 1913.....	13,000
Mar. 4, 1915 (allotment of Apr. 1, 1915).....	5,000
July 27, 1916.....	5,000
	89,500
Total.....	92,500
Received from sale of property and deposited to the credit of the appropriation.....	100
Total.....	92,600

CONTRACT IN FORCE.

Contractor: River & Harbor Improvement Co., Philadelphia, Pa.
Character and amount of work: Dredging, 21,000 cubic yards.
Unit price: 17½ cents per cubic yard, place measurement.
Date of approval: June 3, 1916.
Date fixed for commencement: August 7, 1916.
Date of actual commencement: Work not yet commenced.
Date fixed for completion: November 7, 1916.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Coal.....	3,700	\$24,650
Fertilizer.....	5,000	10,500
Fish, hides, ice, sand, stone, and bricks.....	908	8,790
Lumber.....	950	8,700
Crude oil.....	10,000	30,000
Farm produce.....	11,565	322,800
Manure.....	35,000	73,750
Salt hay.....	400	3,600
Total.....	67,553	482,790
Shipments:		
Fertilizers.....	2,000	5,000
Farm produce.....	2,585	150,500
Tomatoes.....	17,500	200,000
Total.....	22,085	361,500
Total receipts and shipments.....	89,638	844,290

Vessels sailing and trading in Raccoon Creek, N. J.

Class.	Number.	Tonnage.	Draft.
Power boats.....	4	400	<i>Feet.</i> 4-6
Barges.....	11		4-6
Total.....	15	400	

There are 21 wharves or docks on the stream, most of which are private, but open to public use for nominal wharfage charge.

The foregoing statistics were obtained upon inquiry by a United States inspector from those interested in the commerce on Raccoon Creek, N. J.

5. OLDMANS CREEK, N. J.

No operations were in progress during the fiscal year owing to the fact that the channel had not sufficiently deteriorated to warrant dredging for maintenance. The amount expended for office expenses and inspections, amounting to \$1,089.09, was for maintenance.

APPROPRIATIONS.

June 25, 1910.....	\$45,000
Mar. 4, 1915 (by transfer).....	7,000
Total.....	88,000

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Fertilizers.....	1,250	\$37,625
Coal.....	2,500	15,500
Building material.....	515	8,200
Manure.....	35,000	61,250
Grain.....	1,760	64,000
Miscellaneous.....	725	17,250
Total.....	41,750	203,825
Shipments:		
Tomatoes.....	18,000	180,000
Farm produce.....	688	40,050
Total.....	18,688	220,050
Total receipts and shipments.....	60,438	423,875

Vessels sailing and trading in Oldmans Creek, N. J.

[Daily and weekly trips during season.]

	Number.	Aggregate tonnage.	Draft.
			<i>Feet.</i>
Steamer.....	1	200	6½
Do.....	1	83	6½
Gasoline vessel.....	1	94	8
Gasoline boats.....	4	60	5-5½
Tugs.....	5	.....	6½
Scows.....	9	2,250	4½
Schooners.....	4	.....	4-6½

There are 15 wharves on the creek. They are private, but no objection is made to their use by the public, but open to freight lines for a nominal wharfage charge.

The foregoing statistics were furnished by Messrs. H. S. Justice & Co., of Pedricktown, N. J.

6. SALEM RIVER, N. J.

Work, under the contract of the Rickards Dredging Co., for dredging in this river in combination with dredging in Maurice River, N. J., and Little River, Del., was begun on this stream October 1, 1915, and completed June 8, 1916. The channel across Salem Cove was dredged to a depth of 8 feet and width of 100 feet for a length of 4,940 feet. Shoals between the mouth of the river and Penns Neck Bridge, varying in width from 15 to 100 feet and aggregating 1,340 feet in length, were dredged to a depth of 8 feet. Above Penns Neck Bridge a channel was dredged up Little Salem River to a depth of 8 feet and a width of 40 feet for a length of 2,000 feet. Material consisting of mud, sand, clay, gravel, and marl, amounting to 36,747 cubic yards, place measurement, was dredged and redeposited ashore above high water at near-by localities. The amount expended during the fiscal year was \$12,916.92, all of which was for maintenance.

APPROPRIATIONS.

Previous project (amount as per H. Doc. No. 1491, 63d Cong., 2d sess., p. 547)-----	\$18, 700. 00
Present project:	
Mar. 2, 1907-----	\$29, 000. 00
Mar. 3, 1909 (allotment Jan. 28, 1910)-----	5, 000. 00
June 25, 1910-----	12, 000. 00
Feb. 27, 1911-----	10, 600. 00
July 25, 1912-----	5, 000. 00
Mar. 4, 1913-----	15, 000. 00
July 27, 1916-----	10, 000. 00
	<hr/> 88, 600. 00
Total of appropriations-----	105, 300. 00
Amount carried to surplus fund of Treasury-----	1, 490. 66
	<hr/> 108, 809. 34
Net total-----	108, 809. 34
Received from sale of property and deposited to credit of appropriation-----	100. 00
	<hr/> 108, 909. 34
Grand total-----	108, 909. 34

CONTRACT IN FORCE.

Contractor: The Rickards Dredging Co., Philadelphia, Pa.
 Character and amount of work: Dredging 36,747 cubic yards.
 Unit price: 29 cents per cubic yard, place measurement.
 Date of approval: September 21, 1914.
 Date fixed for commencement: October 1, 1915.
 Date of actual commencement: October 1, 1915.
 Date fixed for completion: June 9, 1916.
 Date of actual completion: June 8, 1916.
 Percentage of completion: 100.

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COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Fuel and refined oils.....	7,070	\$159,458
Salt hay.....	2,500	15,000
Lumber.....	950	42,750
Box boards.....	4,500	30,000
Coal.....	1,120	3,500
Sand and stone.....	5,000	8,500
Fertilizers.....	8,000	225,000
Fish and oysters.....	1,300	100,000
Farm produce.....	2,504	33,900
Oyster shells.....	17,500	25,000
Miscellaneous.....	16,003	795,000
Total.....	66,447	1,429,108
Shipments:		
Tomatoes.....	333	4,000
Canned goods.....	700	82,000
Miscellaneous.....	6,500	344,500
Total.....	7,533	400,500
Total receipts and shipments.....	73,980	1,829,608

Vessels sailing and trading in Salem River, N. J.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Steamer.....	1	195	<i>Fed.</i> 9	Daily.
Steam tugs.....	5	300	9	Irregular.
Barges.....	5	.....	4-6	20 trips yearly.
Gasoline barges.....	2	92	4-5	Irregular.
Total.....	13	587		

Several schooners and many small gasoline and sailing vessels ply in and out of Salem River constantly in addition to the above.

There are 18 wharves on the river, 5 of which are public.

The foregoing statistics were furnished by J. K. Waddington & Sons and Salem Freight Co., Salem, N. J.

7. ALLOWAY CREEK, N. J.

There have been no operations during the year, as shoaling in the improved channel has not been sufficient to warrant dredging operations for maintenance. The project has been completed. No expenditures.

APPROPRIATIONS.

Present project:		Present project—Continued.	
Sept. 19, 1890.....	\$6,000	Feb. 27, 1911.....	\$5,000
July 13, 1892.....	3,000	July 25, 1912.....	3,000
Aug. 18, 1894.....	3,000	Mar. 4, 1913.....	5,000
June 3, 1896.....	3,000		
Mar. 3, 1899.....	3,000	Total.....	50,500
June 13, 1902.....	3,000	Received from sales of prop-	
Mar. 3, 1905.....	3,000	erty and deposited to credit	
Mar. 2, 1907.....	5,000	of appropriation.....	100
Mar. 3, 1909 (allotment			
Oct. 28, 1909).....	5,000	Total.....	50,600
June 25, 1910.....	3,500		

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Empty boxes, baskets, and cans.....	872	\$61,900
Salt hay.....	2,000	12,000
Fertilizers.....	800	24,000
Lumber and building material.....	145	1,080
Canned goods.....	350	16,000
Fish, oysters, and ice.....	1,780	145,200
Coal, feed, groceries, and machinery.....	4,800	169,340
Miscellaneous.....	925	27,000
Total.....	11,672	450,480
Shipments:		
Canned goods.....	5,350	364,280
Tomatoes and farm produce.....	875	11,000
Miscellaneous.....	1,445	112,325
Total.....	7,670	487,605
Total receipts and shipments.....	19,342	938,085

Vessels sailing and trading in Alloway Creek, N. J.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
			<i>Fst.</i>	
Gas steamers.....	3	160	6	Irregular.
Steam.....	1	178	9	Do.
Schooners.....	6	120	4	Do.
Barges.....	5	750	4-5	Do.
Total.....	15	1,228		

There were six gasoline fishing boats of a gross tonnage of about 14 tons built during the year.

There are six wharves on the creek, all of which are private, but no charge is made for wharfage at any of them.

The foregoing statistics were furnished by Mr. William C. Fennimore, of Hancocks Bridge, N. J.

8. COHANSEY RIVER, N. J.

There were no operations during the year as the improved channel had not shoaled sufficiently to warrant dredging operations. The project for maintenance has been completed. The amount expended during the fiscal year for office expenses and inspections was \$201.96, for maintenance.

APPROPRIATIONS.

Previous projects (amount as per H. Doc. No. 1491, 63 Cong., 3d sess., p. 430).....	\$36,000
Present project:	
Mar. 2, 1907.....	\$55,800
Mar. 3, 1909 (allotment Dec. 1, 1909).....	6,000
July 25, 1912.....	3,500
Total.....	65,300
Total.....	101,300
Transfer under river and harbor act of Mar. 4, 1915.....	3,000
Net total.....	98,300
Received from sale of property and deposited to credit of appropriation.....	100
Grand total.....	98,400

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Coal.....	11,732	\$39,780.00
Chemicals and gasoline.....	200	20,968.00
Lumber.....	5,400	152,000.00
Fish and oysters.....	4,580	147,000.00
Canned goods.....	1,000	64,000.00
Wheat and hay.....	10,280	75,200.00
Total	33,142	498,918.00
Shipments: Tomatoes and empty cases.....	30,090	396,664.80
Total shipments and receipts	63,802	898,472.80

Vessels sailing and trading in Cohansey River, N. J.

Class.	Number.	Tonnage.	Draft.	Remarks.
			<i>Feet.</i>	
Tugboats.....	1	278	8	Various trips.
Steamers.....	3	628	7-8	Do.
Gas steamers.....	4	197	6-6½	Do.
Barges.....	7	1,680	7-8	Do.
Schooners.....	20	600	5	Daily in season.
Total	35	3,380		

It is reported that 32 schooners and sloops of a total tonnage of 960 were repaired during the year.

There are 22 wharves and docks on the river, most of which are private. No charge is made to the public, however, for their use, except in one instance, where a nominal charge is made. No direct connection is made from any of these wharves with any transportation company.

The foregoing statistics were furnished by William Schillingsburg, Jr., of Greenwich Piers, N. J., and other shippers on the Cohansey. It is believed that this statement of commerce may not fully represent all the actual commerce transported on this stream during the year 1915.

9. MAURICE RIVER, N. J.

Under a contract approved September 21, 1914, for dredging Maurice River and Salem River, N. J., and Little River, Del., dredging operations which were begun October 19, 1914, were continued for a channel 6 feet deep and 100 feet wide from the mouth outward across Maurice Cove for a length of 3,660 feet. Two shoals inside the mouth, averaging 43 feet and 84 feet in width and 300 feet and 835 feet in length, respectively, were dredged to a depth of 6 feet. Material consisting of mud and sand amounting to 29,398 cubic yards, place measurement, was dredged and redeposited upon the river bank above high water by a second dredge. The amount expended during the fiscal year on new work was \$14,451.03 and for maintenance \$2,446.06, a total of \$16,897.09.

APPROPRIATIONS.

Previous project (amount as per H. Doc. No. 1491, 63d Cong., 3d sess., p. 484)	\$48,000
Present project:	
June 25, 1910	\$25,000
July 25, 1912	20,000
Mar. 4, 1913	80,000
July 27, 1918	10,000
	<hr/> 85,000
Total	128,000
Transferred under river and harbor act of Mar. 4, 1915	3,000
Net total	<hr/> 125,000

CONTRACT IN FORCE.

Contractor: The Rickards Dredging Co., Philadelphia, Pa.
 Character and amount of work: Dredging 84,574 cubic yards.
 Unit price: 28½ cents per cubic yard, place measurement.
 Date of approval: September 21, 1914.
 Date fixed for commencement: October 25, 1914.
 Date of actual commencement: October 19, 1914.
 Date fixed for completion: August 24, 1915.
 Date of actual completion: September 29, 1915.
 Percentage of completion: 100.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts: Coal, wood, fish, oysters, clams, refined oils, hay, etc.....	51,562	\$1,363,771.00
Shipments: Molding sand, tomatoes, oysters, hay, etc.....	143,598	155,827.80
Total for shipments and receipts.....	195,160	1,519,598.80

Vessels sailing and trading in Maurice River, N. J.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Tugs.....	4	420	<i>Feet.</i> 9-10	Irregular.
Steamers.....	7	550	9	Do.
Barges.....	11	4,000	9	Do.
Sloops and schooners.....	46	1,390	4-7	Daily in season.
Total.....	68	6,360		

In addition to the above, oyster boats estimated to number 400, of a draft 8 to 7 feet, with an average tonnage of 80 tons, ply in the stream continually during the year.

Vessels of a tonnage of about 6,000 tons were repaired during the year.

There are 48 wharves and oyster piers on the river.

The foregoing statistics, which do not include all the commerce, were furnished by Whitall Tatum Co., Millville, N. J.; Mr. W. A. Lambert, Bivalve, N. J.; J. W. Paxson Co., Philadelphia, Pa.; and Pettinos Bros., Philadelphia, Pa.

10. COLD SPRING INLET, N. J.

Under authority of the Chief of Engineers, dated June 21, 1915, the dredge *Key West* was transferred temporarily from Jacksonville, Fla., to complete dredging of the 25-foot channel under provisions of article 3 of contract with Nelson Z. Graves, dated October 13, 1913. The dredge began work on July 12, 1915, and to November 25, 1915, when it was withdrawn, a channel was dredged 25 feet deep and 400 feet wide for a distance of 750 feet and 200 feet wide for a farther distance of 450 feet near the outer end of the west jetty. Sand and mud amounting to 137,561 cubic yards, place measurement, was removed from the channel and deposited at sea.

Under date of September 21, 1915, a contract was entered into with the Coast & Lakes Contracting Corporation for repairs to the stone jetties. Work was begun on October 23, 1915, and was completed on May 5, 1916. Under the contract 7,712.09 short tons of stone was placed on the east jetty and 1,311.25 short tons on the west jetty, a total of 9,023.34 short tons.

The amount expended during the fiscal year for new work, covering the dredging, was \$20,218.27, and for maintenance, covering repairs to jetties, was \$31,815.69, a total of \$52,033.96.

APPROPRIATIONS.

GOVERNMENT FUNDS.

Present project:

Mar. 2, 1907 (river and harbor act)-----	\$311, 000
May 27, 1908 (sundry civil act)-----	236, 200
Mar. 4, 1909 (sundry civil act)-----	284, 000
Mar. 4, 1911 (sundry civil act)-----	130, 000
Mar. 4, 1915 (allotment from river and harbor act)-----	20, 000
July 1, 1916 (sundry civil act)-----	20, 000
July 27, 1916 (river and harbor act)-----	40, 000
Total of appropriations-----	1, 041, 200
Transferred under river and harbor act of Mar. 4, 1915-----	60, 000
Net total-----	961, 200

CONTRIBUTED FUNDS.

Contributed by Cape May Real Estate Co-----	100, 000
Total of United States and contributed funds-----	1, 061, 200

CONTRACTS IN FORCE.

Contractor: Coast & Lakes Contracting Corporation, New York City.

Character and amount of work: Repairs to stone jetties, 9,023.34 short tons of stone.

Date of approval: October 19, 1915.

Date fixed for commencement: November 21, 1915.

Date of actual commencement: October 23, 1915.

Date fixed for completion: May 21, 1916.

Date of actual completion: May 5, 1916.

Percentage of completion: 100.

Contractor: Nelson Z. Graves, Philadelphia, Pa.
 Character and amount of work: Dredging, 1,650,000 cubic yards.
 Unit price: 6 cents per cubic yard, place measurement.
 Date of approval: October 15, 1913.
 Date fixed for commencement: November 19, 1913.
 Date of actual commencement: December 30, 1913.
 Date fixed for completion: January 20, 1915. (Waived.)
 Date of actual completion: Work suspended.
 Percentage of completion: 85.

COMMERCIAL STATISTICS.

It was not practicable to obtain complete commercial statistics.

11. ABSECON INLET, N. J.

The dredge *Absecon* continued dredging over the bar whenever conditions were favorable, resulting in a channel between the 12-foot contours of at least 450 feet wide, and with depths in the thalweg of 20 feet and over. Sand amounting to 358,965 cubic yards, bin measurement, was removed and redeposited at sea. The amount expended during the fiscal year was \$44,785.98.

APPROPRIATIONS.

Present project:	
July 25, 1912	\$190,000.00
Mar. 4, 1913	(¹)
Oct. 2, 1914	25,000.00
Mar. 4, 1915 (allotment of Apr. 1, 1915)	60,000.00
July 27, 1916	25,000.00
Total	300,000.00
Receipt from sales and deposited to credit of appropriation	.90
Grand total	300,000.90

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Fish	1,298	\$58,771.67
Oysters	267	3,827.00
Clams	133	3,223.00
Merchandise	1,698	2,591,385.00
Total	3,396	2,657,006.67
Shipments:		
Fish	5	395.00
Coal	1,000	4,000.00
Miscellaneous	606	3,079.00
Merchandise	240	360,625.00
Total	1,851	368,099.00
Total receipts and shipments	5,237	3,025,105.67

Passengers carried to and from New York City and the fishing banks in the Atlantic Ocean, 39,616.

¹ \$45,000 was appropriated conditionally by act of Mar. 4, 1913. The conditions were not fulfilled. Under act of Mar. 4, 1915 the \$45,000 was transferred from the act of Mar. 4, 1913, in addition to \$15,000, making the \$60,000 named under act of Mar. 4, 1915.

Vessels sailing and trading in Absecon Inlet, N. J.

Class.	Number.	Tonnage.	Draft.	Remarks.
			<i>Fect.</i>	
Schooners.....	20	600	4-9	Various.
Sloops, yachts.....	50	750	3-6	Do.
Gas steamers.....	4	80	5-6	Do.
Total.....	74	1,430		

In addition to the above, there are a large number of steam yachts, gas steamers, sloops, and schooners plying continually on the stream.

12. ABSECON CREEK, N. J.

The channel was redredged 5 feet deep and 60 feet wide from a point 700 feet upstream from the mouth outward across the flats to deep water in Absecon Bay a distance of 4,600 feet. Material, consisting of soft mud, amounting to 29,199 cubic yards, place measurement, was removed and redeposited in the bay to the west of the channel and on the banks of the creek above high water. The amount expended during the fiscal year was \$4,553.31, all of which was for maintenance.

APPROPRIATIONS.

Present project:	
July 25, 1912.....	\$15,000
Mar. 4, 1913.....	1,600
July 27, 1916.....	1,600
Total.....	18,200

CONTRACT IN FORCE.

Contractor: Hill Dredging Co., Atlantic City, N. J.
 Character and amount of work: Dredging, 29,199 cubic yards.
 Unit price: 13.9 cents per cubic yard, place measurement.
 Date of approval: August 12, 1915.
 Dated fixed for commencement: September 15, 1915.
 Date of actual commencement: November 19, 1915.
 Date fixed for completion: July 15, 1916.
 Date of actual completion: December 18, 1915.
 Percentage of completion: 100.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Oysters and clams.....	2,200	\$30,000
Miscellaneous.....	1,170	30,660
Total.....	3,370	110,660
Shipments: Oysters, coal, and logs.....	329	4,350
Total receipts and shipments.....	3,699	115,010

No complete statement of vessels sailing and trading in Absecon Creek, N. J., could be obtained.

There are four wharves on the creek—one public and three private—all open to the public use.

The foregoing statistics were furnished by Mr. S. W. Giebersen, of Absecon, N. J.

13. TUCKERTON CREEK, N. J.

Operations were begun on December 29, 1915, for redredging the channel 6 feet deep and 70 feet wide from a point 1,000 feet upstream from the mouth outward to the mouth, and 6 feet deep and 80 feet wide across Little Egg Harbor to the head of Marchelder Channel, a length of 6,700 feet. Soft mud and shells to the amount of 52,972 cubic yards, place measurement, were removed and redeposited on the adjacent banks and on the west side of the channel across the bay. The amount expended during the fiscal year was \$10,862.38, all of which was for maintenance.

APPROPRIATIONS.

Present project:		Present project—Continued.	
June 13, 1902-----	\$12,000	Feb. 27, 1911-----	\$23,380
Mar. 8, 1905-----	12,000	Mar. 4, 1913-----	5,000
Mar. 2, 1907-----	12,000	Mar. 4, 1915 (allotted	
Mar. 3, 1909 (allotted		Apr. 1, 1915)-----	5,000
Mar. 13, 1909)-----	2,000		
June 25, 1910-----	12,000	Total-----	33,380

CONTRACT IN FORCE.

Contractor: Hill Dredging Co., Atlantic City, N. J.
 Character and amount of work: Dredging 52,972 cubic yards.
 Unit price: 19½ cents per cubic yard, place measurement.
 Date of approval: August 12, 1915.
 Date fixed for commencement: September 15, 1915.
 Date of actual commencement: December 29, 1915.
 Date fixed for completion: July 15, 1916.
 Date of actual completion: February 24, 1916.
 Percentage of completion: 100.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Fish, oysters, and clams-----	18,487	\$778,500
Miscellaneous-----	500	14,100
Total-----	18,987	792,600
Shipments:		
Coal and wood-----	298	2,904
Farm produce-----	825	24,175
Oyster shells, oysters, clams, ice, etc.-----	1,887	82,250
Total-----	3,010	109,329
Total receipts and shipments-----	21,997	901,929

Vessels sailing and trading in Tuckerton Creek, N. J.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Gasoline vessel.....	1	21	<i>Feet.</i> 5	Daily.
Do.....	1	5	3	Do.
Oyster schooners.....	20	400	5½	Daily, in season.
Barges.....	2	.....	5½	
Total.....	24	426		

In addition to the above there are a number of motor boats coming and going over these waters during the year.

There are four public landings on the stream at which no charge is made for wharfage. No direct connection is made from these wharves with railroad or other transportation lines. There are about 30 additional private wharves along the creek.

One gasoline boat of 21 tons, one scow of 20 tons, and about 25 small boats of a total tonnage of 25 tons were built during the year. There is one 10-ton vessel under construction.

Two passenger-boat lines—one between Tuckerton and Beach Haven, the other between Tuckerton, Beach Haven, and Atlantic City. These carried 4,160 passengers during the year.

Fishing boats carried about 500 passengers to and from the fishing banks.

The foregoing statistics were furnished by the Board of Trade of Tuckerton, N. J.

14. TOMS RIVER, N. J.

No operations were in progress. The amount expended during the fiscal year was \$33.78, all of which was for maintenance.

APPROPRIATIONS.

Present project:

June 25, 1910.....	\$10, 050
July 25, 1912.....	1, 000
Mar. 4, 1913.....	1, 000
July 27, 1916.....	2, 000
Total.....	14, 050

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Coal.....	560	\$3, 750
Ship timber, assorted lumber, etc.....	3, 020	9, 500
Machinery.....	2	2, 000
Miscellaneous.....	1, 000	7, 500
Total.....	4, 582	22, 750
Shipments:		
Fish.....	15	3, 000
Oysters and clams.....	400	5, 000
Total.....	415	8, 000
Total receipts and shipments.....	4, 997	30, 750

Vessels sailing and trading in Toms River, N. J.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Gasoline boats.....	14	44	Fect. 4-5	Daily.

In addition to the above, pleasure boats, estimated to number 500, ply in the stream continually during the year.

One wooden vessel of a tonnage of 18 tons, built during the year.

Vessels of a tonnage of 720 tons were repaired during the year.

There are 22 wharves on the river.

The foregoing statistics were furnished by Messrs. William Fisher, John P. Kirk, and David C. Brewer, of Toms River, N. J.

15. CHESTER RIVER, PA.

There were no operations during the year.

APPROPRIATIONS.

Mar. 3, 1881.....	\$3,000.00
Aug. 2, 1882.....	3,000.00
July 27, 1916.....	3,000.00
	<hr/> 9,000.00

COMMERCIAL STATISTICS.

None were available.

16. WILMINGTON HARBOR, DEL.

The work of constructing the Fruhling-type dredge *Minquas* was continued until completion on September 8, 1915. The final trials and guaranty tests were completed during December, 1915, and dredging operations were carried on, before and after the tests, by removing shoaling in the channel from various points in the river, between the upper end of the Harlan & Hollingsworth Corporation shipyard and the mouth of the river, a distance of 17,500 feet. The materials for the pipe line were purchased and erected at various points along the river for the discharge of the dredged material ashore. Mud, amounting to 258,400 cubic yards, by measurement, was removed and redeposited on shore through discharge pipe line.

Work was continued on the bulkhead, etc., at the depot under the contract of Cloud, Stiles & Work (Inc.), to complete the balance of the work left unfinished by the failure and subsequent annulment of the Tatnall-Brown contract. This work was completed October 9, 1915. The river in front and the slip alongside of the bulkhead were dredged under the emergency contract with the Rickards Dredging Co. Mud, amounting to 6,977 cubic yards, by measurement, was removed and redeposited, partly as filling behind the bulkhead and the remaining portion was taken to yard of the dredging company and there placed ashore above high water. Grading and other incidental work around the depot was done by hired labor.

A contract for general repairs to the north jetty and its protection by placing fender piling along the channel face of its water portion, was entered into with C. R. Simpson. Work was begun on August 10, 1915, and completed February 19, 1916. The delay in completing the contract was caused by the unusually high run of tides, the low tides not falling sufficiently to permit the work at that level being done.

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Expended upon construction of dredge <i>Minquas</i>	\$36,404.70
Expended in operation of dredge <i>Minquas</i>	85,686.92
Expended in contract dredging at dredge depot.....	1,881.25
Expended on bulkhead at dredge depot.....	8,683.54
Expended in grading, etc. (hired labor), at dredge depot.....	229.11
Expended in repairs to north jetty.....	10,430.50
Office expenses, superintendence and inspection.....	17,142.29
Total	104,987.81

APPROPRIATIONS.

Previous projects (amount as per H. Doc. No. 1491, 63d Cong., 3d sess., p. 579).....	\$404,606.00
Present project:	
July 1, 1898.....	\$205,846.00
Mar. 3, 1899.....	45,000.00
June 6, 1900.....	200,000.00
June 13, 1902.....	50,000.00
Mar. 3, 1905.....	25,000.00
Mar. 3, 1905 (allotment Nov. 28, 1906).....	250.00
Mar. 2, 1907.....	75,000.00
Mar. 2, 1907.....	¹ 437.72
Mar. 3, 1909.....	40,000.00
June 25, 1910.....	100,000.00
Feb. 27, 1911.....	100,000.00
July 25, 1912.....	250,000.00
Mar. 4, 1913.....	30,000.00
Oct. 2, 1914 (allotment Oct. 7, 1914).....	30,000.00
Mar. 4, 1915 (allotment Apr. 1, 1915).....	45,000.00
July 27, 1916.....	30,000.00
	1,226,538.72
Total of appropriations.....	1,631,139.72
Returned to the Treasury to the surplus fund from general appropriations.....	2,411.22
Net total of appropriations.....	1,628,728.50
Removal of obstructions above Churchmans Bridge.....	500.69
	1,628,227.81
Received from sales and deposited to credit of appropriation.....	668.26
Grand total.....	1,628,896.07

CONTRACTS IN FORCE.

Contractor: Spedden Shipbuilding Co., Baltimore, Md.
 Character and amount of work: Construction of dredge, \$186,390.
 Date of approval: October 30, 1913.
 Date fixed for commencement: November 13, 1913.
 Date of actual commencement: About November 6, 1913.
 Date fixed for completion: September 13, 1914. (Waived.)
 Date of actual completion: September 8, 1915.
 Percentage of completion: 100.

Contractor: Spedden Shipbuilding Co., Baltimore, Md.
 Character and amount of work: Extra work and modifications in contract for construction of dredge *Minquas*, \$2,315.83
 Date of approval: October 23, 1914 (supplemental contract).
 Date fixed for completion: September 13, 1914. (Waived.)
 Date of actual completion: September 8, 1915.
 Percentage of completion: 100.

¹ Allotments of \$1,250, of which \$812.28 was returned to Treasury.

Contractor: The Rickards Dredging Co., Philadelphia, Pa.
 Character and amount of work: Dredging 6,977 cubic yards.
 Unit price: 19.8 cents per cubic yard, place measurement.
 Date of approval: Emergency contract.
 Date fixed for commencement: November 14, 1915.
 Date of actual commencement: November 23, 1915.
 Date fixed for completion: December 4, 1915.
 Date of actual completion: December 4, 1915.
 Percentage of completion: 100.

Contractor: Cloud, Stiles & Work (Inc.), Chester, Pa.
 Character and amount of work: Construction of bulkhead, etc., \$3,200.
 Date of approval of supplemental contract: June 5, 1915.
 Date fixed for commencement: June 12, 1915.
 Date of actual commencement: June 23, 1915.
 Date fixed for completion: June 30, 1915. (Waived.)
 Date of actual completion: October 9, 1915.
 Percentage of completion: 100.

Contractor: C. R. Simpson, New York City.
 Character and amount of work: Repairs to north jetty.
 Unit prices: Round piling, 43 cents per linear foot; timber, \$61.50 per M feet,
 b. m.; iron, 4½ cents per pound; stone, \$2.35 per cubic yard.
 Date of approval: July 23, 1915.
 Date fixed for commencement: August 25, 1915.
 Date of actual commencement: August 10, 1915.
 Date fixed for completion: November 26, 1915.
 Date of actual completion: February 19, 1916.
 Percentage of completion: 100.

COMMERCIAL STATISTICS.

(For calendar year ending Dec. 31, 1915.)

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Oysters.....	24	\$610.00
Sand, gravel, etc.....	112,352	48,926.60
Grain.....	132	4,546.64
Acid.....	3,377	19,228.00
Produce.....	1,196	26,694.08
Oil, gasoline, etc.....	9,497	120,689.33
Machinery.....	150	1,000.00
Lumber.....	6,473	95,263.00
Iron.....	4,266	115,623.79
Miscellaneous.....	67,233	81,295,906.28
Chemicals, drugs, etc.....	3,044	152,100.00
Cotton goods.....	8,210	9,282,741.00
Goatskins.....	5,274	10,548,000.00
General merchandise.....	39,949	7,989,800.00
Pulp wood.....	42,583	180,979.88
Barytes ore.....	1,724	12,168.00
Total.....	305,584	59,712,298.66
Shipments:		
Cotton goods.....	4,892	5,381,200.00
Leather.....	1,417	4,251,000.00
Vulcanized fiber.....	667	192,750.00
General merchandise.....	18,648	2,729,600.00
Printing paper.....	1,592	159,200.00
Coal.....	18,586	52,295.72
Manure.....	190	270.00
Sand, gravel, etc.....	7,210	5,172.00
Machinery, boilers, etc.....	1,310	142,798.58
Provisions.....	125	50,000.00
Miscellaneous.....	31,903	20,810,440.31
Iron.....	2,526	206,778.15
Flour, feed, and hay.....	63	1,696.50
Total.....	84,129	33,983,196.21
Total receipts and shipments.....	389,713	93,695,494.87

Number of passengers carried, 2,112,080.

Vessels sailing and trading in Wilmington Harbor.

Class.	Number.	Draft.
Barges.....	36	<i>Feet.</i> 4- 9
Power boats.....	18	2- 5½
Steamers.....	4	9-11
Ferryboats.....	2	6½
Total.....	60	

In addition to the above there were two steamships, 80 tugboats, 15 gasoline steamers, 20 schooners, 3 pile drivers, and 110 barges having a total tonnage of 45,300, with a draft of from 4 to 16 feet.

Vessels built.

Class.	Number.	Class.	Number.
Oil barge.....	1	Deck lighter.....	1
Car floats.....	2	Dump scows.....	3
Ferryboat.....	1	Seagoing barges.....	2
Oil tank steamships.....	2		
Covered barges.....	4	Total (value, \$1,708,260).....	17
Tank scow.....	1		

Vessels repaired.

Class.	Number.	Class.	Number.
Steamboats.....	10	Fishing boats.....	23
Steamships.....	2	Inspection boat.....	1
Steam yacht.....	1	Motor boats.....	4
Tugboats.....	36	Scows.....	11
Ferryboats.....	10	Dredges.....	2
Car floats.....	5		
Barges.....	4	Total (value, \$128,310).....	111
Pilot boats.....	3		

On the west side of the Christiana River there is practically continuous wharfage from the plant of the American Car & Foundry Co. to the Delaware mills of the Jessup & Moore Paper Co. On the east side there is almost continuous wharfage for about the same distance. The most important wharves are located on the west side. Of the more important wharves, those at the foot of Fourth Street, Lombard Street, King Street, French Street, Shipley Street, and Tatnall Street are owned by the city and leased to private concerns at a nominal rental. The wharf at the foot of Church Street is owned by the city and maintained as a municipal wharf. The Baltimore & Ohio Railroad wharf, at the foot of Shipley Street, has direct connection with points along the Atlantic seaboard.

There is also considerable wharfage along the Brandywine River, but such wharves are used little, except for unloading barges of coal.

The foregoing statistics were obtained from vessel owners, masters, clerks, etc., as prescribed by the act of Congress approved February 21, 1891, and checked as far as possible by figures furnished by those interested in the commerce on Christiana River, Del.

17. APPOQUINIMINK, MURDERKILL, AND MISPELLION RIVERS, DEL.

(A) APPOQUINIMINK RIVER.

There were no operations during the year, as the shoaling in the improved channel did not amount to sufficient to warrant dredging for maintenance. The amount expended during the fiscal year was \$5, all of which was for maintenance.

APPROPRIATIONS.

Present project:

Sept. 19, 1890	\$5,000.00
July 13, 1892	5,000.00
Aug. 18, 1894	5,000.00
June 3, 1896	5,000.00
Mar. 3, 1899	5,000.00
June 13, 1902 (allotted July 30, 1902)	2,896.91
June 13, 1902 (allotted June 23, 1904)	4,000.00
Mar. 3, 1905 (allotted April 18, 1905)	5,500.00
Mar. 3, 1905 (allotted Mar. 20, 1907)	100.00
Mar. 2, 1907 (allotted Mar. 20, 1907)	5,000.00
Mar. 3, 1909 (allotted June 29, 1909)	5,000.00
June 25, 1910 (allotted Aug. 30, 1910)	6,000.00
Feb. 27, 1911 (allotted May 22, 1911)	5,000.00
July 25, 1912 (allotted Sept. 26, 1912)	3,500.00
Mar. 4, 1913 (allotted May 10, 1913)	5,000.00

Total 67,096.91

Received from sales of property and deposited to the credit of the appropriation 150.00

Grand total 67,246.91

COMMERCIAL STATISTICS.

It was impracticable to obtain complete commercial statistics.

(B) MURDERKILL RIVER.

Shoals aggregating 3,433 feet in length from the mouth outward across the flats to the 7-foot curve in Delaware Bay, and shoals aggregating 5,900 feet in length within the river between the mouth and Frederica, were removed to a depth of 7 feet and a width of 60 feet. Mud, sand, clay, and shells to the amount of 32,067 cubic yards, place measurement, were excavated and redeposited upon the adjacent banks or on the southwestern side of the channel. The amount expended during the fiscal year was \$4,996.61, all of which was for maintenance.

APPROPRIATIONS.

Present project:

July 13, 1892	\$7,000.00
Aug. 18, 1894	5,000.00
June 3, 1896	6,500.00
Mar. 3, 1899	5,000.00
June 13, 1902 (allotted July 30, 1902)	2,000.00
Apr. 23, 1904 (allotted June 16, 1904)	5,500.00
Mar. 3, 1905 (allotted Apr. 18, 1905)	5,500.00
Mar. 3, 1905 (allotted Apr. 3, 1906)	3,860.00
Mar. 2, 1907 (allotted Mar. 20, 1907)	8,000.00
Mar. 2, 1907 (allotted Apr. 18, 1908)	3,000.00
Mar. 3, 1909 (allotted May 1, 1909)	7,000.00
June 25, 1910 (allotted Aug. 30, 1910)	15,000.00

Present project—Continued.

Feb. 27, 1911 (allotted May 22, 1911)	\$5,000.00
July 25, 1912 (allotted Sept. 26, 1912)	3,000.00
Mar. 4, 1913 (allotted May 10, 1913)	5,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	5,000.00
July 27, 1916 (allotted Oct. 16, 1916)	5,000.00
Total of appropriations	96,360.00
Carried into surplus fund of Treasury	409.01
Net total of appropriations	95,950.99

¹ Allotment of \$3,000, of which \$3.09 was returned to the Treasury.

² Appropriation of \$6,500, of which \$1,500 was expended on St. Jones River, Del.

CONTRACT IN FORCE.

Contractor: River & Harbor Improvement Co., Philadelphia, Pa.
 Character and amount of work: Dredging, 32,067 cubic yards.
 Unit price: 13.7 cents per cubic yard, place measurement.
 Date of approval: October 6, 1915.
 Date fixed for commencement: November 13, 1915.
 Date of actual commencement: January 3, 1916.
 Date fixed for completion: July 28, 1916.
 Date of actual completion: February 26, 1916.
 Percentage of completion: 100.

COMMERCIAL STATISTICS.

[For year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts: Coal, fish, oysters, clams, stone, fertilizers, lime, oyster shells, sugar, salt, empty cans, general merchandise, etc.....	17,152	\$379,225.50
Shipments: Logs, hay, canned goods, grain, and general merchandise.....	18,793	633,732.00
Total receipts and shipments.....	32,945	1,012,955.50

Number of passengers carried during year, 8,185.

Vessels sailing and trading in Murderkill River, Del.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Steamer.....	1	203	<i>Fed.</i> 6	2 trips weekly.
Do.....	1	93	6	Transient.
Do.....	1	33	6	Do.
Gasoline boats.....	4	350	5½	Do.
Schooners.....	2	46	5	Do.
Total.....	9	865		

There are three wharves on the river, and they are free to the public.

The foregoing statistics were furnished by the Frederica & Philadelphia Navigation Co., and Mr. H. S. Frazer and the Munsen Canning Co., of Frederica, Del.

(C) MISPELLION RIVER.

Shoals varying in width from 0 to 60 feet and aggregating 5,930 feet in length, within the river between the mouth and a point 12½ miles upstream, were removed to a depth of 6 feet and a width of 60 feet. Mud, sand, clay, gravel, and shells, amounting to 14,485 cubic yards, place measurement, was removed and redeposited upon the adjacent banks above high water. Repairs were made to the jetties by replacing broken or decayed timbers, replacing of stone in the portion of the jetties where it had settled or fallen out, and applying a preservative to the tops of the piles. The amount expended during the fiscal year for dredging was \$2,288.63; for jetty repairs,

\$6,311.83; and for office expenses and inspection, \$1,578.60. The total expenditure, amounting to \$10,179.06, was for maintenance.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 487)	\$78,490.07
Present project:	
Mar. 2, 1907 (allotted Mar. 20, 1907)	\$40,000.00
Mar. 8, 1909 (allotted June 15, 1909)	7,000.00
June 25, 1910 (allotted Aug. 30, 1910)	39,000.00
Feb. 27, 1911 (allotted May 22, 1911)	5,000.00
July 25, 1912 (allotted Sept. 28, 1912)	8,000.00
Mar. 4, 1913 (allotted May 10, 1913)	17,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	10,000.00
July 27, 1916 (allotted Oct. 16, 1916)	10,000.00
	184,000.00
Total of appropriations	212,490.07
Transferred to Appoquinimink River from allotment under act of Mar. 3, 1905	100.00
Net total	212,390.07

CONTRACTS IN FORCE.

Contractor: River & Harbor Improvement Co., Philadelphia, Pa.

Character and amount of work: Dredging 14,485 cubic yards.

Unit price: 15.8 cents per cubic yard, place measurement.

Date of approval: October 5, 1915.

Date fixed for commencement: November 12, 1915.

Date of actual commencement: March 8, 1916.

Date fixed for completion: July 27, 1916.

Date of actual completion: May 17, 1916.

Percentage of completion: 100.

Contractor: C. R. Simpson, New York City.

Character and amount of work: Repairs to jetties, \$6,311.83.

Unit prices: Pine piling, \$1.30 per linear foot; round timber, 39 cents per linear foot; iron, 5½ cents per pound; stone, \$4.20 per cubic yard.

Date of approval: September 16, 1915.

Date fixed for commencement: October 18, 1915.

Date of actual commencement: September 20, 1915.

Date fixed for completion: January 17, 1916.

Date of actual completion: December 6, 1915.

Percentage of completion: 100.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts: Coal, phosphate, fertilizer, lumber, empty cans, general merchandise, fish, and king crabs	20,948	\$500,535.08
Shipments: Salt hay, tomatoes, grain, phosphate, canned goods, general merchandise, fish oil, fish scrap, etc.	10,830	414,811.00
Total receipts and shipments	31,778	1,014,346.08

¹ Does not include \$159.93 returned to Treasury from emergency allotments under acts of June 6, 1900, and June 18, 1902.

Vessels sailing and trading in Mispillion River, Del.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
			<i>Feet.</i>	
Steamer.....	1	140	6½	Triweekly.
Do.....	1	150	7	Weekly.
Do.....	1	143	8	Do.
Gas steamer.....	1	95	6	Irregular.
Schooners.....	3	60	5-7	Do.
Total.....	7	888		

Considerable freight is handled by transient vessels belonging elsewhere. There are 12 wharves on the river, 4 of which are free to the public. One steamer and four lighters, aggregate tonnage of 1,175 tons, and a value of \$86,000, were built during the year. Ten vessels, aggregating 1,500 tons, were repaired during the year, value of repairs amounting to \$5,000.

The foregoing statistics were furnished by Mr. George F. Pierce and other vessel owners and shippers of Milford, Del. It is thought that the statement represents only a fraction of actual commerce on the stream during 1915.

18. SMYRNA RIVER, DEL.

Dredging was begun May 23, 1916, and at the end of the fiscal year a channel had been dredged 7 feet deep and 60 feet wide from a point about 1½ miles below Smyrna Landing upstream for a length of 2,000 feet. A channel had been dredged 7 feet deep and 100 feet wide across the flats outside the mouth for a length of 600 feet, and partial dredging had been done in cut-off at North West Branches. Mud, sand, and clay amounting to 27,870 cubic yards, place measurement, was dredged, most of which was redeposited upon the adjacent banks and the remainder on the south side of channel outside the mouth. The amount expended during the fiscal year was \$748.07, of which \$747.09 was for new work on the present project and 98 cents on the previous project.

APPROPRIATIONS.

Previous projects (amount as per H. Doc. No. 1491, 63d Cong., 3d sess., p. 555).....		\$81,965.00
Present project (1910):		
June 25, 1910.....	\$25,000.00	
Feb. 27, 1911.....	15,000.00	
July 27, 1916.....	10,000.00	
		50,000.00
Total.....		131,965.00
Returned to credit of appropriation.....	4,157.37	
Deduction on account of amount transferred under river and harbor act of Mar. 4, 1915.....	20,000.00	
		24,157.37
Net total.....		107,807.63

CONTRACT IN FORCE.

Contractor: River & Harbor Improvement Co., Philadelphia, Pa.
 Character and amount of work: Dredging 115,000 cubic yards.
 Unit price: 8.9 cents per cubic yard, place measurement.

Date of approval: May 17, 1916.
 Date fixed for commencement: June 22, 1916.
 Date of actual commencement: May 23, 1916.
 Date fixed for completion: January 22, 1917.
 Date of actual completion: Work in progress.
 Percentage of completion: 14.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts: Phosphate, shells, feed, gravel, stone, lumber, coal, salt.....	11,390	\$229,010.99
Shipments: Oil, fish scrap, phosphate, tomatoes, hay, canned goods, produce, live stock, poultry, junk.....	7,190	241,407.33
Total receipts and shipments.....	18,580	470,418.32

Vessels sailing and trading in Smyrna River, Del.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Steamer.....	1	96	<i>Feet.</i> 7	2 trips a week.
Gasoline boats.....	4	188	5-7	Irregular.
Schooner.....	1	34	6	Do.

In addition to the foregoing, there are about 15 power boats, tugs with barges and floats, and a number of schooners and other sailing vessels that trade in the river, of which no record has been kept. These carry grain, hay, wood, fish, oysters, lime, shells, etc.

There are eight wharves and numerous landings on the river, all of which are open to the public.

The foregoing statistics were furnished by Mr. Lewis M. Price and other vessel owners and shippers of Smyrna, Del., but it is believed that the figures given do not represent the full amount of commerce carried on the river.

19. LEIPSIC RIVER, DEL.

The amount expended during the fiscal year was \$1,990.14, all of which was for maintenance, and included surveys, inspections, office and contingent expenses, etc. No operations were in progress.

APPROPRIATIONS.

Present project:

June 25, 1910.....	\$18,500
July 25, 1912.....	19,600
Mar. 4, 1913.....	5,000
July 27, 1916.....	5,000
Total.....	48,100

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts: Coal, fertilizer, sugar, salt, lime, oyster shells, fish, and empty cans.....	2,787	\$67,570
Shipments: Tomatoes, grain, salt hay, canned goods.....	9,726	180,450
Total receipts and shipments.....	12,483	248,020

Vessels sailing and trading in Leipsic River, Del.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Steamer.....	1	83	Feet. 7½	20 trips a year.
Do.....	1	195	9	10 trips a year.
Tugboat.....	1	62	6.2	Occasionally.
Barge.....	1	500	Do.	Do.
Sailing vessels.....	18	407	4-6	Daily and weekly trips during season.
Gasoline boats.....	14	560	3-6	Do.
Total.....	26	1,807		

There are nine wharves on the river, one of which is public. The others are private, but all are accessible to the public on equal terms.

No vessels built or repaired during the year.

The foregoing statistics were furnished by Mr. William Shackell, of Cheswold, Del.

20. LITTLE RIVER, DEL.

No operations were in progress. The amount expended during the fiscal year for office expenses and inspections, amounting to \$10, was for maintenance.

APPROPRIATIONS.

Present project:	
July 25, 1912.....	\$14,000
Mar. 4, 1913.....	1,000
July 27, 1916.....	3,000
Total.....	18,000

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts: Coal, fish, oysters, clams, sand, fertilizers, empty cans, and machinery.	2,064	\$33,677.50
Shipments: Grain, tomatoes, oyster shells, cattle, fruit, and wood.....	3,805	73,370.00
Total receipts and shipments.....	5,889	107,047.50

Vessels sailing and trading on Little River, Del.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Steamers.....	2	250	<i>Feet.</i> 6½	Irregular trips.
Gasoline boat.....	1	100	6½	Do.
Do.....	1	40	5½	Weekly in season.
Sail and power boats.....	3	130	5-6	Daily in season.
Total.....	7	520		

In addition to the above, there are a number of sailing vessels and power launches, draft and tonnage not known, using the stream regularly.

There are three wharves on the river, two of which are private and the other public. A charge of \$1 per day is made by the owners of the private wharves for their use. There is no direct connection thereon with any railroad or other transportation line.

The foregoing statistics were furnished by Mr. Howard McGonigal and others, of Little Creek, Del. It is believed that this statement may not fully represent all the actual commerce transported on this stream during 1915, as it was impracticable to obtain complete statistics.

21. ST. JONES RIVER, DEL.

No operations were in progress. From time to time since the adoption of the project in 1910, deeds for land necessary for the cut-offs were sent in as secured until seven had been received up to the passage of the river and harbor act of 1915, which modified the project so that the work of improvement could proceed without first having secured title to the land needed for all the cut-offs. Upon the passage of the river and harbor act of March 4, 1915, these seven deeds were returned to the interested parties to be brought up to date, and as yet have not been received back. The amount expended during the fiscal year was \$25.70 for office expenses, all of which was for maintenance of previous project.

APPROPRIATIONS.

Previous project (amount as per H. Doc. No. 1491, 63d Cong., 3d sess., p. 544).....	\$72, 150. 00
Present project:	
June 25, 1910.....	\$25, 000. 00
Feb. 27, 1911.....	11, 700. 00
Mar. 4, 1913.....	5, 000. 00
	41, 700. 00
Total.....	113, 850. 00
Returned to Treasury.....	1, 593. 50
Net total.....	112, 256. 50

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts: Coal, fertiliser, machinery, crabs, clams, oysters, groceries, general merchandise, etc.....	2,494	\$42,370.25
Shipments: Grain, fruit, live stock, tomatoes, salt hay, etc.....	4,569	129,110.00
Total.....	7,063	171,480.25

Vessels sailing and trading in St. Jones River, Del.

Class.	Number.	Tonnage.	Draft.	Remarks.
			<i>Fect.</i>	
Steamer ¹	1	96	6	2 and 3 trips per week.
Steamer.....	1	110	7	Irregular.
Gas steamer.....	1	20	5	Do.
Schooners.....	8	60	4½	Do.
Total.....	4	286		

¹ Discontinued in November, 1915.

There are 10 private wharves and landings along the river at which no charge is made to the public for wharfage. No direct communication is made from these wharves with railroad companies or other transportation lines.

The foregoing statistics were furnished by the Dover & Philadelphia Navigation Co., of Dover, Del., and J. K. Sapp, of Magnolia, Del., and they are not consider complete.

22. BROADKILL RIVER, DEL.

No operations were in progress during the fiscal year. Proposals for jetty repairs at the mouth were opened on May 26, 1916. Award was made to C. R. Simpson, the lowest bidder, and the contract forwarded to the Chief of Engineers for approval. The expenditures, \$228.65, for office expenses and inspections were for maintenance.

APPROPRIATIONS.

Previous project (amount as per H. Doc. No. 1491, 63d Cong., 3d sess., p. 414)	\$35,000.00
Present project:	
Mar. 2, 1907.....	\$33,330.00
Mar. 2, 1907 (allotment Oct. 20, 1908).....	¹ 4,332.67
Mar. 2, 1907 (allotment Dec. 8, 1908).....	3,200.00
Mar. 3, 1909 (allotment June 28, 1909).....	3,000.00
June 25, 1910.....	5,000.00
Feb. 27, 1911.....	10,000.00
July 25, 1912.....	5,000.00
Mar. 4, 1913.....	5,000.00
Mar. 4, 1915 (allotment Apr. 1, 1915).....	5,600.00
	78,862.67
Total.....	108,862.67
Received from sales and deposited to the credit of the appropriation..	100.00
Grand total	108,962.67

¹ Allotment of \$4,500, of which \$167.33 was returned to Treasury to credit of appropriation.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
Fertilizer, coal, empty cans, iron pipe, etc.....	1,300	\$21,550
General.....	2,123	36,068
Total.....	3,423	56,213
Shipments:		
Fruit and farm produce, cordwood, piling.....	750	10,650
Grain.....	8	272
Strawberries.....	102	6,000
Fish, oysters, etc.....	77	4,180
Lumber.....	1,400	12,000
Total.....	2,397	33,702
Total receipts and shipments.....	5,879	91,915

Vessels sailing and trading in Broadkill River, Del.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Schooners.....	4	200	<i>Fect.</i> 2½-4	Irregular trips
Power boats.....	11	75	2½-6½	Do.
Total.....	15	275		

The foregoing statistics were obtained from vessel owners, masters, clerks, etc., as prescribed by the act of Congress, approved February 21, 1891, and checked as far as possible by figures furnished by those interested in the commerce on Broadkill River, Del. It is believed that this statement of commerce may not fully represent all the actual commerce transported on this stream.

23. INLAND WATERWAY BETWEEN REHOBOTH BAY AND DELAWARE BAY, DEL.

Dredging operations which were in progress at the close of the previous fiscal year were continued. The drag-line scraper was continued on the work but after a fair trial proved inadequate, and on November 22, 1915, was replaced by a suction dredge. A channel 5 feet deep and a least bottom width of 40 feet was dredged from the southern limit of Gordon Lake southward to within about 450 feet of the railroad crossing at Rehoboth. Sand, mud, and clay to the amount of 180,046 cubic yards, place measurement, were excavated and redeposited on the adjacent banks. The amount expended during the fiscal year for dredging was \$26,976.06, all of which was for new work. On September 25, 1915, payment of the court's award of \$69,710.25 to the Delaware, Maryland & Virginia Railroad Co. for right of way at Rehoboth was made.

APPROPRIATIONS.

Present project:	
July 25, 1912.....	\$50,000
Mar. 4, 1913.....	41,725
Mar. 4, 1915 (allotted Apr. 1, 1915).....	76,000
July 27, 1916.....	50,000
	217,725

CONTRACTS IN FORCE.

Contractor: Southern Dredging Co., Mobile, Ala.
 Character and amount of work: Excavation, 240,000 cubic yards.
 Unit price: 18.9 cents per cubic yard, place measurement.
 Date of approval: February 15, 1915.
 Date fixed for commencement: March 30, 1915.
 Date of actual commencement: March 29, 1915.
 Date fixed for completion: January 30, 1916.
 Date of actual completion: Work in progress.
 Percentage of completion: 78.

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts:		
General.....	2,122	\$36,663
Coal.....	240	1,000
Lime.....	60	400
Machinery.....	180	5,000
Phosphate.....	200	5,000
Oyster shells from Chincoteague, Va.....	520	960
General merchandise.....	800	50,000
Total.....	3,792	99,023
Shipments:		
Strawberries.....	807	58,500
Fish, oysters, etc.....	77	4,180
Lumber.....	1,960	20,100
Mine props.....	3,540	12,780
Baskets of tomatoes (99,635).....	1,224	10,040
Box shooks.....	150	3,000
Cordwood.....	110	216
Cases tomatoes, pears, etc. (47,000).....	1,645	94,000
Potatoes.....	50	1,420
Total.....	9,863	204,216
Total receipts and shipments.....	13,655	\$308,239

There were 3,650 passengers reported as carried during the year.

Vessels sailing and trading in the inland waterway between Rehoboth Bay and Delaware Bay.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Schooners.....	4	200	Fect. 2½-4	Irregular trips. Do.
Power boats.....	11	76	2½-6½	
Total.....	15	276		

The foregoing statistics were obtained from vessel owners, masters, clerks, etc., as prescribed by the act of Congress approved February 21, 1891, and checked as far as possible by figures furnished by those interested in the commerce on Broadkill River, Del. It is believed that this statement of commerce may not fully represent all the actual commerce transported on this stream.

24. INLAND WATERWAY FROM CHINCOTEAGUE BAY, VA., TO DELAWARE BAY, AT OR NEAR LEWES, DEL.

No operations were in progress during the fiscal year. The expenditures, amounting to \$45.36 for office expenses and inspections, were for maintenance.

APPROPRIATIONS.

Aug. 5, 1886.....	\$18,750.00
Aug. 11, 1888.....	50,000.00
Sept. 19, 1890.....	50,000.00
July 13, 1892.....	25,000.00
Aug. 18, 1894.....	25,000.00
June 3, 1896.....	25,000.00
June 25, 1910.....	1,500.00
Oct. 2, 1914 (allotment Oct. 7, 1914).....	1,000.00
Mar. 4, 1915 (allotment Apr. 1, 1915).....	1,000.00
Total	197,250.00
Returned to Treasury to credit of appropriation from general appropriations.....	7.70
	197,242.30

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

[Between Isle of Wight Bay and Bahoboth Bay, Del.]

Class.	Short tons.	Value.
Receipts:		
Coal.....	240	\$1,000.00
Lime.....	60	400.00
Machinery.....	150	5,000.00
Phosphate.....	200	5,000.00
Oyster shells from Chincoteague, Va.....	520	960.00
General merchandise.....	500	50,000.00
Total	1,670	62,360.00
Shipments:		
Lumber.....	1,050	8,500.00
Fish, oysters, clams, etc.....	157	2,772.98
Mine props.....	3,840	12,760.00
Baskets of tomatoes (69,635).....	1,224	10,040.00
Box shooks.....	160	3,000.00
Cordwood.....	110	216.00
Cases tomatoes, pears, etc. (47,000).....	1,645	94,000.00
Crates strawberries (31,300).....	708	52,500.00
Potatoes.....	50	1,420.00
Total	8,931	185,208.98
Total receipts and shipments	10,601	247,568.98

There were 3,650 passengers reported as carried during the year.

Vessels sailing and trading in the inland waterway from Chincoteague Bay, Va., to Delaware Bay, at or near Lewes, Del.

Class.	Number.	Aggregate tonnage.	Draft.	Remarks.
Schooners.....	6	300	Feet. 5-8 2½	Irregular trips. Do.
Tugboat.....	1	100		
Total	7	400		

The foregoing statistics were obtained from vessel owners, masters, clerks, etc., as prescribed by the act of Congress approved February 21, 1891, and checked as far as possible by figures furnished by those interested in the commerce on the inland waterway from Chincoteague Bay, Va., to Delaware Bay at or near Lewes, Del. It is believed that this statement of commerce may not fully represent all the actual commerce transported on this stream.

25. WATERWAY ON THE COAST OF VIRGINIA.

No operations were in progress during the fiscal year. The amount expended during the fiscal year for office expenses and inspections was \$25.44, all of which was for maintenance.

APPROPRIATIONS.

Present project:

June 25, 1910.....	\$12, 100
July 27, 1916.....	1, 000
Total.....	13, 100

COMMERCIAL STATISTICS.

[For calendar year ending Dec. 31, 1915.]

Receipts and shipments.

Class.	Short tons.	Value.
Receipts: Lumber, clams, oysters, fish, building material, and general merchandise	25, 000	\$45, 000. 00
Shipments: Coal, wood, and general merchandise.....	7, 262	18, 962. 80
Total.....	32, 262	63, 962. 80

Vessels sailing and trading on the inland waterway of Virginia.

Class.	Number.	Draft.
Power boats.....	14	<i>Max.</i> 2½-4
Schooners.....	2	3-7
Barges.....	2	2½-3½
Sloop.....	1	3
Total.....	19	

The foregoing statistics were obtained from vessel owners, masters, clerks, etc., as prescribed by the act of Congress approved February 21, 1891.

IMPROVEMENT OF RIVERS AND HARBORS IN THE BALTIMORE, MD., DISTRICT.

REPORT OF COL. JOHN BIDDLE, CORPS OF ENGINEERS.

IMPROVEMENTS.

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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 418 TO 469.

1. PATAPSCO RIVER AND CHANNEL TO BALTIMORE, MD.

No work of dredging was done during the fiscal year, but an examination of the channels was made and work done in connection with establishment of new harbor lines. Contract was made for maintenance dredging in the Craighill-Cutoff angle, but no dredging was done.

APPROPRIATIONS.

The following are the amounts and dates of appropriations for improving harbor at Baltimore, Md., including Patapsco River and Chesapeake Bay:

Previous projects (from H. Doc. No. 1491, 63d Cong., 3d sess., p. 402)		\$4, 796, 030. 00
Present project:		
Mar. 3, 1905	\$250, 000	
June 30, 1906	500, 000	
Mar. 2, 1907	500, 000	
Mar. 4, 1907	500, 000	
May 27, 1908	750, 000	
Mar. 4, 1909	985, 000	
July 25, 1912	50, 000	
Mar. 4, 1913	305, 250	
		8, 820, 250. 00
Total of appropriations		8, 616, 280. 00
Transferred under river and harbor act of Mar. 4, 1915		68, 600. 00
Net total		8, 547, 680. 00
Receipts from sales of public property	\$52. 56	
Receipts from sales of maps	6. 25	
		58. 81
Grand total		8, 547, 738. 81

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co., for dredging an estimated quantity of 300,000 cubic yards of material at 8½ cents per cubic yard, approved June 26, 1916; date fixed for beginning July 29, 1916, and of expiration of contract January 29, 1917.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

	Foreign.		Domestic and coastwise.		Total.		Passengers.
	Entered.	Cleared.	Arrivals.	Departures.	Number.	Net tonnage.	
Foreign:							
Steam vessels	1, 032	1, 064			2, 096	4, 408, 387	252
Sailing vessels	20	18			38	38, 194	
American:							
Steam vessels	63	49	258	246	616	1, 409, 276	23, 893
Sailing vessels	27	31		3	61	69, 982	
Steamers			6, 740	6, 698	13, 438	11, 556, 680	951, 756
Sailing vessels, scows, and barges			18, 780	18, 630	37, 410	4, 828, 200	
Total	1, 142	1, 162	25, 778	25, 577	53, 650	22, 310, 729	975, 901

Principal articles imported.

Articles.	Amount in customary units.	Amount in short tons.	Value.
FREE.			
Ammonia, sulphate of.....	11,834,000 pounds.....	5,917	\$355,084
Bananas.....	1,975,484 bunches.....	¹ 49,387	610,639
Burlaps.....	9,296,609 pounds.....	4,668	644,153
Clover seed.....	4,472,203 pounds.....	2,236	480,629
Cocoanuts.....	2,598,000 pounds ¹	1,299	64,940
Corkwood and waste.....	2,261,953 pounds.....	1,131	40,513
Chrome ore.....	35,491 tons.....	35,491	384,175
Fertilizers.....	12,104 tons.....	12,104	202,513
Hair, unmanufactured.....	44,189 pounds.....	22	6,755
Herring, salted.....	480,259 pounds.....	245	20,903
Iron pig.....	33,541 tons.....	33,541	1,972,540
Iron ore.....	573,813 tons.....	573,813	1,670,012
Mackerel, salted.....	228,196 pounds.....	114	11,324
Manganese ore.....	279,372 tons.....	279,872	2,213,064
Mineral oil, crude.....	86,206,771 gallons.....	¹ 284,482	1,238,265
Palm oil.....	4,744,601 pounds.....	2,372	320,660
Paper stock.....	8,308,944 pounds.....	4,154	139,270
Potash:			
Carbonate of.....	100,538 pounds.....	50	3,239
Muriate of.....	9,121 tons.....	9,121	341,147
Sulphate of.....	1,416 tons.....	1,466	66,673
Soda, nitrate of.....	77,025 tons.....	77,025	1,816,149
Sulphur ore.....	186,687 tons.....	186,687	1,046,742
Salt.....	9,684,300 pounds.....	4,842	13,060
Tea.....	159,925 pounds.....	80	37,616
Tin, in pigs.....	851,363 pounds.....	426	299,483
Wood pulp.....	58,396 tons.....	58,396	2,092,395
All other free goods.....	17,096 tons.....	¹ 17,096	1,709,635
Total free of duty.....		1,645,517	17,801,556
DUTIABLE.			
Ammonia, muriate of.....	691,182 pounds.....	346	34,413
Bristles.....	94,849 pounds.....	47	76,344
Cheese.....	72,099 pounds.....	36	15,905
China and earthenware.....		(²)	786,216
Clays and earths.....	12,861 tons.....	12,861	61,154
Cork manufactures.....	428 tons ¹	¹ 428	770,936
Cotton cloths.....	197,220 yards.....	¹ 47	32,175
Cotton hose.....	46,260 dozen pairs.....	¹ 40	23,571
Cotton laces.....	(²).....	(²)	61,964
Cotton manufactures.....	128 tons ¹	¹ 128	64,148
Enamel ware.....	(²).....	(²)	10,244
Iron bars.....	1,281 tons.....	1,281	63,460
Linens, etc.....	140 tons ¹	¹ 140	112,109
Linoleum.....	376,146 yards.....	¹ 1,128	106,422
Licorice root.....	3,459,747 pounds.....	1,725	79,169
Marble.....	2,091 tons ¹	¹ 2,091	41,822
Matting, straw.....	2,777,015 yards.....	¹ 2,083	193,179
Molasses.....	247,479 gallons.....	¹ 1,361	88,285
Olive oil.....	413,191 gallons.....	¹ 1,446	455,129
Paper manufactures.....	362 tons ¹	¹ 362	72,329
Pepper, unground.....	611,886 pounds.....	306	47,236
Rice, broken.....	4,716,278 pounds.....	2,358	100,239
Spirituuous liquors.....	83,346 gallons.....	¹ 292	157,507
Straw braid.....	(²).....	(²)	200,175
Tobacco, leaf.....	136,068 pounds.....	68	85,202
Toys and dolls.....	(²).....	(²)	910,802
Wool dress goods.....	180,090 yards.....	(²)	84,258
All other dutiable articles.....	10,037 tons ¹	¹ 10,037	1,003,737
Total dutiable.....		38,611	5,608,130
Grand total of free and dutiable imports.....		1,684,128	23,449,686

¹ Estimated.² Weights unobtainable.

Principal articles exported.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural implements.....	5,409 tons.....	¹ 5,409	\$540,913
Animal feed, etc.....	2,375 tons.....	¹ 2,375	61,665
Bacon and hams.....	979,610 pounds.....	460	115,908
Beef, canned, cured, and salted.....	2,513,642 pounds.....	1,267	353,787
Binder twine.....	2,985,994 pounds.....	1,498	236,759
Barley.....	4,674,206 bushels.....	112,181	3,470,537
Casings, sausage.....	81,250 pounds.....	41	8,260
Cars, carriages, etc.....	11,120 tons.....	¹ 11,120	1,112,074
Copper.....	87,918,809 pounds.....	43,969	14,337,538
Chemicals and drugs.....	7,088,830 pounds.....	¹ 3,543	708,683
Coal, all kinds.....	1,904,620 tons.....	1,904,620	5,567,260
Coke.....	35,291 tons.....	35,291	137,596
Cotton, raw.....	67,877,837 pounds.....	28,989	6,284,534
Cotton cloth.....	1,636,330 yards.....	¹ 1,636	470,387
Corn.....	17,477,008 bushels.....	524,310	14,007,300
Flour.....	361,083 barrels.....	86,108	5,087,860
Fruits.....	14,955 tons.....	¹ 14,955	448,647
Glucose and grape sugar.....	7,629,593 pounds.....	3,815	189,215
Hair.....	1,750 tons.....	¹ 1,750	383,634
Iron and steel manufactures, except rails and machinery.....	145,080 tons.....	¹ 145,080	6,528,661
Lard.....	1,734,266 pounds.....	867	175,107
Leather manufactures.....	11,462 tons.....	¹ 11,462	1,236,857
Lumber, manufactures of.....	56,750 tons.....	¹ 56,750	1,135,067
Machinery.....	2,364 tons.....	¹ 2,364	236,357
Milk, prepared and condensed.....	74,000 cases.....	¹ 1,862	296,361
Neutral lard and oleo oil.....	885,620 pounds.....	443	107,749
Naval stores.....	3,450 tons.....	¹ 3,450	172,497
Oats.....	23,925,067 bushels.....	358,876	13,347,467
Oils:			
Illuminating.....	191,565 gallons.....	¹ 670	15,437
Lubricating.....	6,038,137 gallons.....	¹ 21,133	746,444
Cottonseed.....	2,238,988 pounds.....	1,119	150,665
Oil cake and meal.....	35,490,407 pounds.....	17,745	589,103
Paper, manufactures of.....	342 tons.....	¹ 342	68,359
Paraffin wax.....	25,165,032 pounds.....	12,588	617,335
Rye.....	9,415,558 bushels.....	282,467	11,203,264
Starch.....	18,249,836 pounds.....	9,125	492,847
Steel rails.....	22,543 tons.....	22,543	594,794
Tallow.....	449,048 pounds.....	226	34,393
Tobacco, leaf.....	79,837,237 pounds.....	39,919	9,152,442
Tobacco stems.....	27,240 pounds.....	14	380
Tin manufactures.....	1,318 tons.....	¹ 1,318	131,802
Wheat.....	21,563,399 bushels.....	646,902	29,367,313
All other articles.....	42,152 tons.....	¹ 42,152	4,215,276
Total.....		4,462,683	134,085,398

¹ Estimated.*Canadian articles received in bond and exported during the year.*

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural implements.....	178 tons ¹	¹ 178	\$17,757
Barley.....	621,414 bushels.....	14,914	385,406
Canned goods.....	9,050 cases.....	303	13,300
Cheese.....	48,700 pounds.....	24	7,000
Clover seed.....	40,866 pounds.....	20	4,477
Ferrosilicon.....	115,160 pounds.....	58	3,695
Flaxseed.....	567 bushels.....	17	1,340
Flour.....	62,450 barrels.....	6,245	354,826
Grapenuts.....	31,900 pounds.....	¹ 16	3,190
Iron and steel.....	1,138,766 pounds.....	569	29,816
Linseed-oil cake.....	678,000 pounds.....	339	8,580
Oatmeal.....	240,000 pounds.....	120	7,928
Rye.....	7,140 bushels.....	214	8,263
Wheat.....	12,499,072 bushels.....	374,672	12,611,498
Total.....		397,689	13,457,086

¹ Estimated.

Domestic and coastwise commerce.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Acid, sulphuric.....	226,146 tons.	226,146	\$1,583,022
Ammonia, sulphate of.....	13,936 tons	13,936	836,160
Asphalt.....	24,019 tons	24,019	288,228
Boots and shoes.....	18,069 tons	18,069	1,445,530
Brick, all kinds.....	26,337,000.	79,011	263,870
Barrel staves.....	500,000.	126	3,000
Cans, empty.....	2,199,120 cases.	18,063	1,099,660
Canned goods.....	2,916,574 cases.	97,708	4,874,891
Cement and lime.....	13,495 tons	13,495	84,344
Cotton.....	147,848 bales.	36,962	7,892,400
Cotton manufactures.....	193,331 cases.	59,000	8,696,895
Coal, all kinds.....	3,452,417 tons.	3,452,417	10,297,261
Clams.....	252,500.	32	1,263
Crabs, hard.....	6,860 barrels.	515	15,720
Crabs, soft.....	73,085 dozen.	219	29,284
Cordwood.....	23,850 cords.	35,775	95,400
Cottonseed meal.....	728,000 pounds	364	12,132
Dry goods.....	70,895 tons	70,895	(¹)
Fertilizer and materials.....	580,089 tons.	580,089	8,701,335
Flour.....	215,520 barrels.	21,552	1,293,120
Fruit and farm produce.....	117,884 tons.	117,884	1,768,260
Fish, all kinds.....	18,286 tons	18,286	1,462,880
General merchandise.....	1,763,800 tons.	1,763,800	176,380,000
Grain (wheat and corn).....	1,577,810 bushels.	47,334	1,577,810
Hay and feed.....	3,669 tons.	3,669	73,380
Iron and steel manufactures.....	88,122 tons	88,122	7,049,760
Ice.....	17,815 tons	17,815	53,445
Lumber, all kinds.....	378,384,000 feet b. m.	662,172	7,567,680
Leather.....	4,530,000 pounds.	2,265	3,171,000
Marble.....	16,000 tons	16,000	320,000
Naval stores.....	19,437 tons	19,437	1,554,960
Oysters, shucked.....	217,000 gallons.	1,085	173,000
Oysters, in shell.....	3,090,625 bushels.	123,625	1,236,250
Oyster shells.....	6,830,734 bushels.	206,192	68,397
Oils, all kinds.....	95,427,714 gallons.	333,997	6,679,940
Ore.....	31,802 tons	31,802	318,020
Peanuts.....	5,427 tons.	5,427	596,970
Piling.....	3,152,116 linear feet.	63,042	394,000
Rails, iron and steel.....	26,274 tons	26,274	788,220
Soda and potash.....	21,849 tons	21,849	1,310,940
Sand and gravel.....	844,764 tons.	844,764	295,667
Seeds.....	6,030 tons.	6,030	603,000
Salt.....	11,598 tons.	11,598	81,186
Tin plate.....	7,720 tons.	7,720	540,400
Tobacco, leaf.....	46,625 tons	46,625	9,325,000
Tobacco, manufactures.....	5,258 tons.	5,258	2,629,000
Tar, coal.....	17,759 tons	17,759	1,243,130
Wool.....	8,724,000 pounds.	4,362	3,751,320
Whiskey.....	1,780,000 gallons.	6,230	3,560,000
Total.....		9,218,442	281,088,030

¹ Value unobtainable.*Summary.*

	Short tons.	Value.
Foreign:		
Imports.....	1,684,128	\$23,409,688
Exports.....	4,462,683	134,085,398
Canadian articles exported.....	397,689	13,457,085
Coastwise and domestic.....	9,218,442	281,088,030
Grand total.....	15,762,942	453,040,202

Imports.

	Free.	Dutiable.	Total.
1914.....	\$30,417,412	\$9,900,479	\$39,317,891
1915.....	17,801,558	5,608,130	23,409,688
Decrease, 1915.....	2,615,854	4,292,349	6,908,203

2108 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Imports in American vessels, 1915:

Sailing-----	\$120, 588
Steam-----	2, 428, 837
Imports in foreign vessels, 1915:	
Sailing-----	88, 685
Steam-----	20, 748, 861
Imports in cars overland, 1915-----	77, 772
Total-----	23, 409, 688

Domestic exports.

Exports in American vessels, 1915:

Sailing-----	\$210, 086
Steam-----	811, 689
Exports in foreign vessels, 1915:	
Sailing-----	196, 518
Steam-----	183, 867, 210
Total-----	184, 085, 898

Amount of duties collected in 1915-----

1, 626, 588

Miscellaneous custom receipts in 1915-----

149, 418

Total receipts in 1915-----

1, 775, 996

Duties on merchandise remaining in bond, 1915-----

199, 304

Summary of duties collected in 1915.

Duties and miscellaneous customs receipts-----	\$1, 775, 996
Duties on merchandise remaining in bond-----	199, 304
Merchandise transported with appraisement-----	11, 005
Total-----	1, 986, 305

The number of vessels documented in the district of Maryland, which includes Baltimore, Crisfield, Annapolis, Washington, D. C., and Alexandria, Va., is 2,014, with a gross tonnage of 278,504. In addition it is estimated that there are operated within the district of Maryland over 5,000 small motor boats.

Vessels built in 1915.

Classes.	Number.	Tons.	Value.
Sailing-----	5	1, 468	\$56, 500
Steam-----	8	39, 644	4, 148, 000
Gasoline-----	16	357	74, 100
Barges-----	10	1, 792	105, 000
Total-----	39	43, 261	4, 383, 600

All of the above were built at the port of Baltimore, Md., with the exception of 4 sail, 150 tons, value \$16,500; and 8 gasoline, 191 tons, value \$46,100, which were built at Crisfield, Md.

The only new line of transportation established during the year was the Furness-Johnson Manchester Liners Joint Service (Ltd.) between Baltimore and Manchester, England.

The sailings of the North German Lloyd to Bremen, Germany; the Hamburg-American Line to Hamburg, Germany; and the Red Star Line to Antwerp, Belgium, have been suspended, due to the European war.

2. CHANNEL TO CURTIS BAY, IN PATAPSCO RIVER, BALTIMORE HARBOR, MD.

No work was done during the fiscal year.

APPROPRIATIONS.

Previous project (from H. Doc. No. 1491, 63d Cong., 3d sess., p. 402) -- \$40, 000

Present project:

June 13, 1902-----	\$50, 000
Mar. 3, 1903-----	148, 000
Mar. 3, 1909 (allotted Mar. 29, 1909)-----	9, 000
June 25, 1910-----	10, 000
Feb. 27, 1911-----	5, 000
Total-----	220, 000
Total-----	260, 000

COMMERCIAL STATISTICS.

The statistics of the port of Baltimore include this harbor.

3. HARBOR OF SOUTHWEST BALTIMORE (SPRING GARDEN), MD.

This channel was dredged in very soft material, where silt has been slowly accumulating for many years. The cost of maintenance for a number of years was large, but the side slopes have flattened out considerably, and it is thought that the cost will be reduced. No field work was done during the fiscal year. If an examination develops any shoaling in the project channel during the next fiscal year, funds available will be applied to its removal by dredging under contract.

APPROPRIATIONS.

June 23, 1896	\$5,000
June 13, 1902	88,000
Mar. 3, 1903	221,000
Mar. 2, 1907	6,500
Mar. 3 1909 (allotted Mar. 29, 1909)	84,000
June 25, 1910	84,000
Feb. 27, 1911	10,000
Total	398,500
Transferred under river and harbor act of Mar. 4, 1915	7,000
Total	391,500

COMMERCIAL STATISTICS.

The statistics of the port of Baltimore include this harbor.

4. ELK AND LITTLE ELK RIVERS, MD.

Dredging under contract for maintenance was begun October 4 and completed October 21, 1915. It resulted in removing 16,849 cubic yards of mud, sand, and silt, consisting of a shoal below the junction of the two rivers, in redredging the entire portion of the project in Elk and 550 feet upward from the junction, in Little Elk. The dredged material was deposited on the marshes on the west side of Elk River and the south side of Little Elk River.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 447)	\$108,968
Present project:	
June 25, 1912	\$4,040
Mar. 4, 1915 (allotted Apr. 2, 1915)	5,000
Mar. 4, 1915 (allotted Apr. 19, 1916)	6,000
July 27, 1916	8,500
	23,540
Total of appropriations	127,508
Sept. 30, 1912, funds contributed by private interests	2,020
Total	129,528
59091°—ENC 1916—133	

CONTRACT IN FORCE.

Contract with Maryland Dredging & Contracting Co. for dredging an estimated quantity of 17,000 cubic yards of material at 26½ cents per cubic yard, approved October 11, 1915; date of beginning work, October 4, 1915; and of expiration of contract, May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Steamers and tugs.....	7	1,130
Sailing and barges.....	67	14,195
Power boats.....	3	425
Unregistered launches.....	150	.....
Total.....	127	15,750

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Fertilizers.....	1,490 tons.....	1,490	\$22,350
General merchandise.....	50 tons.....	50	5,000
Pulp wood.....	21,606 cords.....	43,203	141,026
Total.....		44,933	168,376

This is an increased tonnage of 822 over that reported for 1914.

In addition to the above two barges, with a total tonnage of 2,000, were constructed during 1915.

5. SUSQUEHANNA RIVER ABOVE AND BELOW HAVRE DE GRACE, MD.

The channel was examined for deterioration, and specifications for removals issued.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 561)..... \$97,390
Present project:

Aug. 2, 1882.....	\$25,000
July 5, 1884.....	20,000
Aug. 5, 1886.....	6,000
Aug. 11, 1888.....	10,000
Sept. 19, 1890.....	4,000
July 13, 1892.....	4,000
Aug. 13, 1894.....	4,000
June 13, 1902.....	10,000
Mar. 8, 1905.....	10,000
Mar. 2, 1907.....	20,000
June 25, 1910.....	20,000
Feb. 27, 1911.....	34,500
Mar. 4, 1913.....	51,280
	218,730
Total.....	\$16,120

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamer and tug.....	12	1,745	28,000
Sailing and barges.....	150	45,000	
Launches.....	5	60	
Unregistered, launches.....	75		
Total.....	242	46,805	28,000

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Building materials.....	125 tons.....	125	\$5,000
Cans, empty.....	655,000 cases.....	5,821	341,500
Canned goods.....	52,400 cases.....	1,755	78,000
Cement.....	200 tons.....	200	2,000
Coal, all kinds.....	2,495 long tons.....	2,794	12,475
Corn.....	2,000 bushels.....	60	1,600
Cordwood.....	100 cords.....	150	400
Fertilizers.....	1,550 tons.....	1,550	31,000
Fish, fresh and salt.....	33,400 barrels.....	4,425	155,700
General merchandise.....	10,070 tons.....	10,070	1,007,000
Hay and feed.....	500 tons.....	500	10,000
Lime.....	200 tons.....	200	2,000
Lumber, all kinds.....	3,000,000 feet b. m.....	5,250	75,000
Salt.....	55,100 bushels.....	1,929	16,530
Stones, crushed.....	165,800 tons.....	165,800	165,800
Wheat and rye.....	12,000 bushels.....	360	12,000
Total.....		200,990	1,944,605

This is a decreased tonnage of 24,523 under that reported for 1914.

6. HARBORS AT ROCKHALL, QUEENSTOWN, CLAIBORNE, AND CAMBRIDGE, AND CHESTER, CHOPTANK, WARWICK, WICOMICO, POCOMOKE, LA TRAPPE, AND MANOKIN RIVERS, AND TYASKIN CREEK, MD.

(A) ROCKHALL HARBOR.

No work was done during the fiscal year.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 557).... \$16,600.00

Present project:

June 13, 1902 (allotted Sept. 17, 1902).....	\$12,000.00
Mar. 3, 1905 (allotted May 15, 1905).....	12,829.35
Mar. 2, 1907 (allotted Mar. 22, 1907).....	14,383.97
June 25, 1910 (allotted July 29, 1910).....	21,711.03
Feb. 27, 1911 (allotted Mar. 29, 1911).....	3,947.87
July 25, 1912 (allotted Oct. 5, 1912).....	5,000.00
Mar. 4, 1913 (allotted Apr. 18, 1913).....	10,810.00

90,681.72

Total..... 97,281.72

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	19	1,030	17,112
Sailing and barges.....	49	2,400	
Launches.....	8	85	
Unregistered launches.....	1 200		
Total.....	258	3,515	17,112

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	525 tons.....	525	\$21,000
Bricks.....	100,000 number.....	200	1,000
Canned goods.....	23,000 cases.....	770	24,500
Cement.....	150 barrels.....	30	300
Coal, all kinds.....	4,720 tons.....	4,720	28,320
Corn.....	5,000 bushels.....	150	4,000
Fertilizers.....	1,290 tons.....	1,290	25,800
Fish, fresh.....	112 tons.....	112	8,960
Fruit and farm produce.....	80,000 baskets.....	1,333	15,000
General merchandise.....	1,890 tons.....	1,890	189,000
Lime.....	400 tons.....	400	4,000
Lumber, all kinds.....	45,000 feet b. m.....	79	1,125
Oil:			
Coal.....	1,275 barrels.....	239	6,375
Gasoline.....	1,000 barrels.....	188	10,000
Lubricating.....	750 barrels.....	140	11,250
Oysters, in shell.....	94,000 bushels.....	3,760	47,000
Oysters, shucked.....	20,000 gallons.....	100	16,000
Poultry and live stock.....	280 tons.....	280	28,000
Wheat.....	63,000 bushels.....	1,890	63,000
Total.....		18,096	514,630

This is an increased tonnage of 13,269, over that reported for 1914.

(B) QUEENSTOWN HARBOR.

Dredging under contract for maintenance was begun December 8, 1915, and completed December 30, 1915. Ten thousand cubic yards of sand and mud were removed and redeposited under Hail Point in Chester River. This resulted in removing a shoal extending from a point 700 feet from the mouth of the channel for a distance of 1,100 feet on the easterly side.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 8d sess., p. 533) -- \$19,000.00

Present project:

June 13, 1902 (allotted Sept. 17, 1902).....	\$12,000.00
Mar. 3, 1905 (allotted May 15, 1905).....	4,606.50
Mar. 2, 1907 (allotted Mar. 22, 1907).....	4,975.70

Present project—Continued.

June 25, 1910 (allotted July 29, 1910).....	\$8,607.40
Feb. 27, 1911 (allotted Mar. 20, 1911).....	2,868.42
July 25, 1912 (allotted Oct. 5, 1912).....	5,000.00
Mar. 4, 1913 (allotted Apr. 16, 1913).....	3,600.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	3,000.00
Mar. 4, 1915 (allotted Apr. 19, 1916).....	100.00
	\$44,258.02
Total	63,258.02

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 10,000 cubic yards of material at 26½ cents per cubic yard approved October 11, 1915; date of beginning work December 8, 1915, and of expiration of contract May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	8	2,760	1,017
Baling and barges.....	140	5,000	
Unregistered launches.....	45		
Total	193	7,760	1,017

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	160 tons.....	160	\$6,400
Bricks.....	10,000 number.....	20	100
Canned goods.....	895 cases.....	30	1,342
Coal:			
Anthracite.....	150 tons.....	150	1,050
Bituminous.....	400 tons.....	400	1,600
Corn.....	60,000 bushels.....	1,800	48,000
Fertilisers.....	400 tons.....	400	8,000
General merchandise.....	420 tons.....	420	42,000
Fish, fresh.....	868 barrels.....	115	9,200
Hay and feed.....	25 tons.....	25	500
Lumber.....	28,600 feet b. m.....	50	715
Lime.....	10,000 barrels.....	500	10,000
Oysters, in shell.....	300,000 bushels.....	12,000	120,000
Tomatoes.....	30,000 baskets.....	500	5,000
Wheat.....	70,000 bushels.....	2,100	70,000
Total		18,670	\$23,907

This is a decreased tonnage of 3,067 under that reported for 1914.

(C) CLAIBORNE HARBOR.

Dredging under contract for maintenance was begun January 4, 1916, and completed January 8, 1916. Six thousand seven hundred and twenty-nine cubic yards of sand and mud were removed and re-

deposited in about 85 feet of water, 2 miles distant, in Eastern Bay. This work resulted in removing shoals from the head of the project, outward for a distance of 390 feet.

APPROPRIATIONS.

June 13, 1902 (allotted Sept. 17, 1902)-----	\$15,000.00
Mar. 3, 1905 (allotted May 15, 1905)-----	1,868.35
Mar. 2, 1907 (allotted Mar. 22, 1907)-----	3,440.24
Mar. 3, 1909 (allotted Apr. 9, 1909)-----	12,000.00
June 25, 1910 (allotted July 29, 1910)-----	14,597.81
Feb. 27, 1911 (allotted Mar. 20, 1911)-----	8,947.87
July 25, 1912 (allotted Oct. 5, 1912)-----	8,000.00
Mar. 4, 1913 (allotted Apr. 16, 1913)-----	8,600.00
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	2,000.00
Mar. 4, 1915 (allotted Apr. 19, 1916)-----	100.00
July 27, 1916 (allotted Aug. 22, 1916)-----	2,000.00
	61,548.77
Returned to surplus fund of Treasury-----	1,202.68
Total -----	60,346.09

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 6,750 cubic yards of material at 26½ cents per cubic yard, approved October 11, 1915; date of beginning work January 4, 1916, and of expiration of contract May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	6	2,780	84,130
Sailing and barges.....	70	5,600	-----
Unregistered.....	(1)	-----	-----
Total	76	8,380	84,130

¹ There are also a number of small gasoline launches used for pleasure purposes.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	3,460 tons.....	3,460	\$123,400
Canned goods.....	51,350 cases.....	1,720	77,025
Coal, anthracite.....	40 tons.....	40	250
General merchandise.....	11,930 tons.....	11,930	1,193,000
Lumber, all kinds.....	43,000 feet b. m.....	75	1,075
Oysters, in shell.....	21,350 bushels.....	850	8,500
Poultry and live stock.....	600 tons.....	600	60,000
Ties, railroad.....	35,000.....	2,625	24,500
Total	-----	21,300	1,602,780

This is decreased tonnage of 4,426 under that reported for 1914.

(D) CAMBRIDGE HARBOR.

No dredging operations were carried on, but an examination of the channel was made which showed it to be in good condition.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 419) _ \$50,237. 00
Present project:

June 13, 1902 (allotted Sept. 17, 1902)-----	\$3,000. 00	
Mar. 3, 1905 (allotted May 15, 1905)-----	3,120. 80	
Mar. 2, 1907 (allotted Mar. 22, 1907)-----	1,531. 68	
June 25, 1910 (allotted July 29, 1910)-----	6,450. 58	
Feb. 27, 1911 (allotted Mar. 20, 1911)-----	2,868. 42	
Mar. 4, 1915 (allotted Apr. 19, 1916)-----	200. 00	
		16,671. 43
Total-----		66,908. 43

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	20	3,975	24,281
Sailing and barges.....	170	6,800	
Unregistered launches.....	1,300		
Total.....	490	10,775	24,281

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	480 tons.....	480	\$19,200
Bricks.....	100,000.....	300	1,000
Building materials.....	230 tons.....	230	4,600
Canned goods.....	143,000 cases.....	4,790	215,500
Coal:			
Anthracite.....	2,600 long tons.....	2,912	15,000
Bituminous.....	4,600 long tons.....	5,152	15,456
Corn.....	2,700 bushels.....	75	2,000
Cordwood.....	2,600 cords.....	3,600	10,400
Fertilizers.....	1,835 tons.....	1,835	36,500
Fish, fresh and salt, including crabs.....	1,300 tons.....	1,300	104,000
Flour.....	500 barrels.....	50	3,000
Fruit and farm produce.....	2,000 tons.....	2,000	40,000
General merchandise.....	6,275 tons.....	6,275	627,500
Lumber, all kinds.....	4,263,000 feet b. m.....	7,635	87,260
Oysters, in shell.....	914,000 bushels.....	36,560	365,600
Oyster shells.....	450,000 bushels.....	18,500	9,000
Poultry and live stock.....	350 tons.....	250	70,000
Wheat.....	5,000 bushels.....	150	5,000
Total.....		87,384	1,631,616

This is an increased tonnage of 8,173 over that reported for 1914.

(E) CHESTER RIVER, MD., FROM CRUMPTON TO JONES LANDING.

Dredging under contract for maintenance was begun February 21, 1916, and completed March 20, 1916. It resulted in the removal of 14,783 cubic yards of sand and mud, all of which was placed upon and back of old dredged banks on the south side of the river. Four shoals were removed—first, for a distance of 750 feet from the head of the project, including the turning basin; second, for a length of 1,000 feet about 1 mile below the head of the project; third, for a length of 400 feet at a point about $1\frac{1}{4}$ miles below the head of the project; and, fourth, for a length of 500 feet at a point about 4 miles below the head of the project.

APPROPRIATIONS.

Prior to present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 425)-----		\$41,000.00
Present project:		
Sept. 19, 1890-----	\$5,000.00	
July 13, 1892-----	3,000.00	
Aug. 18, 1894-----	1,500.00	
June 8, 1896-----	1,500.00	
Mar. 3, 1899-----	3,200.00	
June 13, 1902 (allotted Sept. 17, 1902)-----	5,402.00	
Mar. 3, 1905 (allotted May 15, 1905)-----	1,245.00	
Mar. 2, 1907 (allotted Mar. 22, 1907)-----	2,417.86	
Mar. 3, 1909 (allotted Mar. 29, 1909)-----	5,000.00	
June 25, 1910 (allotted July 29, 1910)-----	3,000.00	
Feb. 27, 1911 (allotted Mar. 20, 1911)-----	2,868.42	
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	4,300.00	
		87,932.78
Total of appropriations-----		78,932.78
Carried to surplus fund of Treasury-----		2,958.54
Net total-----		75,974.24

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 15,000 cubic yards of material at 26½ cents per cubic yard, approved October 11, 1915; date of beginning work February 21, 1916, and of expiration of contract May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs-----	16	3,000	8,195
Sailing and barges-----	200	15,800	
Unregistered launches-----	1,400		
Total-----	616	18,800	8,195

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	1,550 tons.....	1,550	\$62,000
Baskets, fruit and vegetable.....	200,000.....	200	8,000
Building materials.....	175 tons.....	175	7,000
Cord wood.....	200 cords.....	300	800
Canned goods.....	10,450 cases.....	350	15,700
Corn.....	46,000 bushels.....	1,380	26,800
Coal:			
Anthracite.....	3,800 long tons.....	4,256	22,800
Bituminous.....	7,100 long tons.....	7,952	21,200
Fertilizer.....	6,100 tons.....	6,100	121,000
Fruits and tomatoes.....	352,620 baskets.....	5,877	58,770
General merchandise.....	5,300 tons.....	5,300	530,000
Gum logs.....	500,000 feet.....	2,750	9,000
Lumber, all kinds.....	1,112,000 feet b. m.....	1,946	23,240
Oysters, in shell.....	17,500 bushels.....	700	7,000
Oils, all kinds.....	300 barrels.....	58	2,250
Stones, crushed.....	300 tons.....	300	800
Wheat.....	58,000 bushels.....	1,740	55,000
Total.....		40,932	\$68,900

This is an increased tonnage of 14,825 over that reported for 1914.

(F) CHOPTANK RIVER.

Dredging under contract for maintenance was begun January 31, 1916, and completed February 10, 1916. It resulted in the removal of 14,005 cubic yards of sand and mud, which was placed upon and back of old dredged banks on both sides of the river. A shoal near Smiths Landing 1,200 feet long and one about 1,600 feet above Brick Mills 1,000 feet long were removed.

APPROPRIATIONS.

June 14, 1880.....	\$5,000.00	June 25, 1910 (allotted	
Mar. 8, 1881.....	5,000.00	July 29, 1910).....	\$4,451.25
Aug. 2, 1882.....	5,000.00	Feb. 27, 1911 (allotted	
July 5, 1884.....	5,000.00	Mar. 20, 1911).....	8,947.87
Aug. 5, 1886.....	10,000.00	July 25, 1912 (allotted	
Aug. 11, 1888.....	7,500.00	Oct. 5, 1912).....	8,000.00
Sept. 19, 1890.....	7,500.00	Mar. 4, 1913 (allotted Apr.	
July 13, 1892.....	8,000.00	18, 1913).....	4,000.00
Aug. 18, 1894.....	2,000.00	Mar. 4, 1915 (allotted Apr.	
June 8, 1896.....	2,000.00	2, 1915).....	4,000.00
Mar. 3, 1899.....	8,000.00	Mar. 4, 1915 (allotted Apr.	
June 13, 1902 (allotted		19, 1916).....	200.00
Sept. 17, 1902).....	3,000.00	Total.....	100,146.17
Mar. 3, 1905 (allotted May			
15, 1905).....	7,885.00		
Mar. 2, 1907 (allotted			
Mar. 22, 1907).....	9,362.55		

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 14,000 cubic yards of material, at 26½ cents per cubic yard, approved October 11, 1915; date of beginning work, January 31, 1916, and of expiration of contract, May 18, 1916.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers
Registered:			
Steamers and tugs.....	20	3, 600	33, 810
Sailing and barges.....	275	11, 000	.....
Unregistered launches.....	(?)	.....	.....
Total.....	295	14, 600	33, 810

¹ There are several hundred small launches and sailing vessels (unregistered) used on this river in fishing, oystering, and pleasure.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	4, 150 tons.....	4, 150	\$166, 000
Bricks.....	10, 000.....	40	100
Cans, empty.....	895, 000 cases.....	5, 067	297, 500
Canned goods.....	240, 450 cases.....	8, 060	380, 675
Cement.....	1, 000 barrels.....	200	1, 500
Coal:			
Anthracite.....	1, 700 long tons.....	1, 904	10, 200
Bituminous.....	2, 000 long tons.....	2, 240	6, 000
Corn.....	38, 000 bushels.....	1, 080	28, 800
Fertilisers.....	2, 100 tons.....	2, 100	42, 000
Hay and feed.....	50 tons.....	50	750
General merchandise.....	12, 000 tons.....	12, 000	1, 200, 000
Lumber.....	900, 000 feet b. m.....	1, 575	15, 000
Oysters, in shell.....	37, 500 bushels.....	1, 500	15, 000
Oyster shells.....	98, 000 bushels.....	2, 940	2, 940
Poultry and live stock.....	1, 200 tons.....	1, 200	240, 000
Stone, crushed.....	1, 000 tons.....	1, 000	1, 000
Wheat.....	180, 000 bushels.....	4, 800	180, 000
Total.....	.....	49, 586	2, 540, 465

This is an increased tonnage of 874 over that reported for 1914.

(G) WARWICK RIVER.

Dredging under contract for maintenance was begun January 21, 1916, and completed January 27, 1916. It resulted in the removal of 9,982 cubic yards of mud, which was redeposited in the Choptank River about 3 miles away, in not less than 30 feet of water. A shoal 600 feet long on the north side and one 500 feet in length on the south of the turning basin at the upper end, were removed.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 573) -- \$6, 000. 00
Present project:

July 13, 1892.....	\$6, 000. 00
Aug. 18, 1894.....	2, 000. 00
June 3, 1896.....	2, 000. 00
Mar. 3, 1899.....	2, 000. 00
June 13, 1902 (allotted Sept. 17, 1902).....	4, 000. 00

Present project—Continued.

Mar. 8, 1905 (allotted May 15, 1905)-----	\$1,909.00
Mar. 2, 1907 (allotted Mar. 22, 1907)-----	3,498.87
Mar. 8, 1909 (allotted Mar. 29, 1909)-----	8,000.00
June 25, 1910 (allotted July 29, 1910)-----	3,000.00
Feb. 27, 1911 (allotted Mar. 20, 1911)-----	1,578.95
July 25, 1912 (allotted Oct. 5, 1912)-----	4,000.00
Mar. 4, 1913 (allotted Apr. 16, 1913)-----	4,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	3,000.00
Mar. 4, 1915 (allotted Apr. 19, 1916)-----	100.00
July 27, 1916 (allotted Aug. 22, 1916)-----	3,000.00
	<hr/> \$48,061.82
Total -----	49,061.82

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 10,000 cubic yards of material, at 26½ cents per cubic yard, approved October 11, 1915; date of beginning work January 21, 1916, and of expiration of contract May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	8	1,120	2,760
Sailing and barges.....	55	1,925	
Unregistered launches.....	45		
Total.....	108	3,045	2,760

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	1,020 tons.....	1,020	\$40,800
Building materials.....	550 tons.....	550	22,000
Cans, empty.....	30,000 cases.....	255	15,000
Canned goods.....	do.....	1,005	45,000
Coal:			
Anthracite.....	200 long tons.....	224	1,400
Bituminous.....	300 long tons.....	336	900
Fertilisers.....	150 tons.....	150	3,000
Fruit and tomatoes.....	2,000 baskets.....	35	350
General merchandise.....	1,576 tons.....	1,576	157,600
Lumber.....	100,000 feet b. m.....	175	2,000
Lime.....	300 tons.....	300	1,200
Oysters, in shell.....	48,000 bushels.....	1,920	19,200
Oysters, shucked.....	25,000 gallons.....	125	20,000
Oyster shells.....	20,000 bushels.....	600	800
Poultry and live stock.....	270 tons.....	270	54,000
Total.....		8,541	333,670

This is an increased tonnage of 2,665 over that reported for 1914.

(H) WICOMICO RIVER.

Dredging under contract for maintenance was begun October 8, 1915, and completed October 30, 1915. It resulted in the removal of 19,973 cubic yards of material, all of which was deposited in about 20 feet of water 4 miles below Fruitland Wharf. A shoal through the Main Street Drawbridge in Salisbury, two others within the city limits, one at Owl Point, and two at Williams Point, aggregating 3,650 feet in length, were removed.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 578) ----- \$50,000

Present project:

Sept. 19, 1890	\$10,000
July 13, 1892	6,500
Aug. 18, 1894	3,000
June 3, 1896	3,700
June 6, 1900	18
June 13, 1902 (allotted Sept. 17, 1902)	6,798
Mar. 8, 1905	5,000
Mar. 2, 1907	2,500
Mar. 3, 1909 (allotted Mar. 29, 1909)	5,000
June 25, 1910	29,000
Feb. 27, 1911 (allotted Mar. 20, 1911)	3,000
July 25, 1912 (allotted Oct. 5, 1912)	3,000
Mar. 4, 1913 (allotted Apr. 16, 1913)	3,000
Mar. 4, 1915 (allotted Apr. 2, 1915)	6,000
July 27, 1916 (allotted Aug. 22, 1916)	3,000
	89,516
Total	139,516

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 20,000 cubic yards of material, at 28½ cents per cubic yard, approved October 11, 1915; date of beginning work, October 8, 1915, and of expiration of contract May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs	15	2,100	9,493
Sailing and barges	95	6,700	
Unregistered, launches	(1)		
Total	110	8,800	9,493

¹ There are several hundred small launches on this river used for fishing, oystering, and pleasure.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	3,110 tons.....	3,110	\$124,400
Bricks.....	2,540,000.....	5,120	25,000
Building material.....	1,500 tons.....	1,500	30,000
Can, empty.....	615,000 cases.....	5,228	297,500
Canned goods.....	110,450 cases.....	3,700	185,675
Cement.....	3,200 tons.....	3,200	24,750
Coal:			
Anthracite.....	3,050 long tons.....	3,416	18,300
Bituminous.....	4,200 long tons.....	4,704	12,600
Cordwood.....	2,100 cords.....	3,150	8,400
Crates, berry.....	40,000.....	200	12,000
Crabs, hard.....	4,000 barrels.....	300	12,000
Fertilizer.....	21,000 tons.....	21,000	420,000
Fish, fresh and salt.....	4,530 barrels.....	600	48,000
General merchandise.....	9,525 tons.....	9,525	952,500
Gravel and stone.....	2,500 tons.....	2,500	3,000
Ice.....	310 tons.....	310	1,240
Lumber, all kinds.....	12,000,000 feet b. m.....	21,000	300,000
Laths.....	1,500,000.....	105	5,250
Oysters, in shell.....	12,750 bushels.....	550	5,500
Oysters, shucked.....	25,000 gallons.....	125	20,000
Oyster shells.....	164,000 bushels.....	4,920	4,920
Poultry and live stock.....	930 tons.....	930	185,000
Wheat.....	30,000 bushels.....	900	30,000
Total.....		96,263	2,717,685

This is an increased tonnage of 20,462 over that reported for 1914.

(I) POCOMOKE RIVER.

No field work was done during the fiscal year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 527)..... \$20,500.00.

Present project:

June 3, 1896.....	\$5,000.00	
Mar. 3, 1899.....	3,000.00	
June 13, 1902 (allotted Sept. 17, 1902).....	4,800.00	
Mar. 3, 1905 (allotted May 15, 1905).....	1,743.00	
Mar. 2, 1907 (allotted Mar. 22, 1907).....	2,298.60	
Mar. 3, 1909 (allotted Mar. 29, 1909).....	2,500.00	
Feb. 27, 1911 (allotted Mar. 20, 1911).....	2,368.42	
Total.....		21,710.02
Total.....		42,210.02

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	10	2,600	1,658
Sailing and barges.....	105	5,750	
Unregistered launches.....	(1)		
Total.....	115	8,350	1,658

¹ There are also numerous small launches used for fishing and pleasure purposes.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	4,000 tons.....	4,900	\$160,980
Barrel staves.....	780,400.....	186	4,980
Building materials.....	2,000 tons.....	2,000	30,000
Canned goods.....	30,000 cases.....	1,000	45,980
Coal:			
Anthracite.....	350 long tons.....	392	2,450
Bituminous.....	800 long tons.....	896	2,580
Fertilizers.....	2,500 tons.....	2,500	50,000
Fruit and tomatoes.....	120,000 baskets.....	2,000	20,000
Fish, fresh.....	2,300 barrels.....	306	12,650
General merchandise.....	5,950 tons.....	5,950	595,000
Gum logs.....	1,636,400 log feet.....	9,000	26,000
Lumber, all kinds.....	2,900,000 feet b. m.....	4,900	55,000
Oysters, in shell.....	22,500 bushels.....	900	9,000
Poultry and live stock.....	615 tons.....	615	128,000
Total.....		34,658	1,137,980

This is an increased tonnage of 881 over that reported for 1914.

(J) LA TRAPPE RIVER.

Dredging under contract for maintenance was begun January 11, 1916, and completed January 19, 1916. It resulted in the removal of 8,464 cubic yards of mud and sand, all of which was scowed away and deposited in 40 feet of water in Choptank River below the mouth of La Trappe River. A shoal 1,300 feet long around the point opposite Lowry Cove was removed.

APPROPRIATIONS.

July 13, 1892.....	\$2,500.00	Mar. 4, 1913 (allotted Apr. 16, 1913).....	\$2,000.00
Aug. 18, 1894.....	4,750.00	Mar. 4, 1915 (allotted Apr. 2, 1915).....	2,500.00
Mar. 8, 1905 (allotted May 15, 1905).....	1,867.50	Mar. 4, 1915 (allotted Apr. 19, 1916).....	100.00
Mar. 2, 1907 (allotted Mar. 22, 1907).....	2,185.39	July 27, 1916 (allotted Aug. 22, 1916).....	1,500.00
Mar. 8, 1909 (allotted Mar. 29, 1909).....	3,000.00	Total.....	24,981.84
Feb. 27, 1911 (allotted Mar. 20, 1911).....	1,578.95		
July 25, 1912 (allotted Oct. 5, 1912).....	3,000.00		

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 8,500 cubic yards of material at 26½ cents per cubic yard, approved October 11, 1915; date of beginning work January 11, 1916, and of expiration of contract May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	5	1,020	761
Sailing and barges.....	70	2,060	.....
Unregistered launches.....	130	.....	.....
Total.....	105	3,080	761

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	780 tons.....	780	\$80,000
Brick.....	80,000.....	100	500
Building materials.....	80 tons.....	80	1,000
Cans, empty.....	24,000 cases.....	168	12,000
Canned goods.....	46,600 cases.....	1,561	69,900
Coal, all kinds.....	510 long tons.....	571	2,550
Corn.....	20,000 bushels.....	600	5,000
Fertilizers.....	550 tons.....	550	11,000
General merchandises.....	1,410 tons.....	1,410	141,000
Lumber, all kinds.....	80,000 feet b. m.....	8	1,000
Lime.....	140 tons.....	140	1,400
Oysters, in shell.....	6,000 bushels.....	240	2,400
Poultry and live stock.....	200 tons.....	200	40,000
Wheat.....	20,000 bushels.....	600	20,000
Total.....	.....	6,949	\$40,750

This is a decreased tonnage of 1,407 under that reported for 1914.

(K) MANOKIN RIVER.

Dredging under contract for maintenance was begun November 23, 1915, and completed December 20, 1915. It resulted in the removal of 16,968 cubic yards of sand and mud, all of which was re-deposited in from 18 to 20 feet of water, about 6 miles below the site of work. A shoal 1,538 feet long between Cockerills and Smiths Points was removed.

APPROPRIATIONS.

Sept. 19, 1890.....	\$7,500.00	Feb. 27, 1911 (allotted Mar. 20, 1911).....	\$3,947.87
July 18, 1892.....	7,500.00	July 25, 1912 (allotted Oct. 5, 1912).....	5,000.00
Aug. 18, 1894.....	4,000.00	Mar. 4, 1915 (allotted Apr. 2, 1915).....	5,000.00
June 3, 1898.....	4,000.00	Mar. 4, 1915 (allotted Apr. 19, 1916).....	100.00
Mar. 3, 1899.....	1,500.00	Total.....	66,662.49
Mar. 8, 1905 (allotted May 15, 1905).....	4,772.50		
Mar. 2, 1907 (allotted Mar. 22, 1907).....	9,160.69		
June 25, 1910 (allotted July 29, 1910).....	14,181.93		

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 17,000 cubic yards of material at 28½ cents per cubic yard, approved October 11, 1915; date of beginning work, November 23, 1915; and of expiration of contract, May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers and tugs.....	4	240
Sailing and barges.....	50	2,100
Unregistered.....	(1)	.....
Total.....	54	2,340

¹ There are quite a number of small gasoline launches and sailing vessels used in oystering.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Bricks.....	120,000.....	240	\$1,200
Building materials.....	200 tons.....	200	4,000
Cans, empty.....	120,000 cases.....	1,020	60,000
Canned goods.....	118,000 cases.....	3,968	177,000
Coal:			
Anthracite.....	400 long tons.....	448	2,800
Bituminous.....	600 long tons.....	672	2,400
Corn.....	1,000 bushels.....	30	800
Cordwood.....	900 cords.....	1,350	3,600
Crabs, hard.....	6,000 barrels.....	300	9,000
Crabs, soft.....	90,000 dozen.....	270	36,000
Fertilizers.....	600 tons.....	600	12,000
Fruits and farm produce.....	200 tons.....	200	4,000
General merchandise.....	1,500 tons.....	1,500	150,000
Lime.....	4,000 tons.....	4,000	40,000
Lumber, all kinds.....	150,000 feet, b. m.....	280	3,750
Oysters.....	110,000 bushels.....	4,400	44,000
Oyster shells.....	200,000 bushels.....	6,000	6,000
Potatoes.....	6,000 bushels.....	180	4,800
Total.....	.....	25,622	561,350

This is an increased tonnage of 7,054 over that reported for 1914.

(L) TYASKIN CREEK.

Dredging under contract for maintenance was begun November 2, 1915, and completed November 18, 1915. It resulted in the removal of 19,963 cubic yards of mud and sand, all of which was redeposited in Nanticoke River below Sandy Hill Wharf, in not less than 20 feet of water. Two shoals were removed, one from the northerly and one from the southerly side of the upper end of the channel, 1,400 feet and 1,200 feet long, respectively.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 8d sess., p. 570)	\$10, 158. 00
Present project:	
Mar. 2, 1907 (allotted Mar. 22, 1907)	\$6, 500. 00
June 25, 1910 (allotted July 29, 1910)	4, 000. 00
Feb. 27, 1911 (allotted Mar. 20, 1911)	1, 578. 94
July 25, 1912 (allotted Oct. 5, 1912)	3, 000. 00
Mar. 4, 1913 (allotted Apr. 16, 1913)	2, 500. 00
Mar. 4, 1915 (allotted Apr. 2, 1915)	6, 000. 00
Mar. 4, 1915 (allotted Apr. 19, 1916)	100. 00
July 27, 1916 (allotted Aug. 22, 1916)	3, 000. 00
	26, 678. 94
Total	36, 836. 94

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co., for dredging an estimated quantity of 20,000 cubic yards of material at 26½ cents per cubic yard, approved October 11, 1915; date of beginning work, November 18, 1915; and expiration of contract, May 13, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs	8	1, 760	575
Sailing and barges	35	2, 100	
Unregistered	(1)		
Total	43	3, 860	575

¹ There are a large number of small oyster and fishing vessels and launches used on this creek, besides which the creek is used as a harbor of refuge in rough weather by oystermen in this vicinity.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products	410 tons	410	\$32, 800
Bricks	80, 000	160	8, 000
Building materials	150 tons	150	3, 000
Cans, empty	20, 000 cases	170	10, 000
Canned goods	7, 000 cases	234	10, 500
Coal, anthracite	540 long tons	940	5, 640
Corn	1, 000 bushels	30	800
Cordwood	150 cords	225	600
Fertilizers	500 tons	500	10, 000
General merchandise	735 tons	735	73, 500
Lumber	28, 800 feet, b. m.	60	700
Oysters, in shell	33, 000 bushels	1, 320	12, 500
Oyster shells	40, 000 bushels	1, 200	1, 200
Oil, coal	500 barrels	100	2, 500
Poultry and live stock	110 tons	110	22, 000
Total		6, 334	194, 440

This is an increased tonnage of 2,347 over that reported for 1914.

7. CORSICA RIVER, MD.

Dredging under contract for completion and maintenance was begun November 11, 1915, and completed December 7, 1915. It resulted in the removal of 17,468 cubic yards of material, which was deposited in Chester River in not less than 30 feet of water. A bar at the mouth of river and the uncompleted portion of the project at its upper end were dredged; also removed a shoal 480 feet long, about 1,000 feet below the wharf at Centerville Landing.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 487)----	\$30,000	
Present project:		
July 25, 1912-----	\$5,368	
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	4,800	
		10,168
Total -----		40,168

CONTRACT IN FORCE.

Contract with the Maryland Dredging & Contracting Co. for dredging an estimated quantity of 17,700 cubic yards of material at 28½ cents per cubic yard, approved October 11, 1915; date of beginning work November 11, 1915, and of expiration of contract May 18, 1916. Contract completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing and barges.....	30	1,500
Power boats.....	10	130
Unregistered launches.....	(1)	.....
Total	40	1,630

¹ There are a small number of launches on this river used for fishing, oystering, and pleasure purposes.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Bricks.....	200,000.....	400	\$2,000
Cans, empty.....	100,000 cases.....	850	50,000
Canned goods.....	80,000 cases.....	2,680	130,000
Coal:			
Anthracite.....	2,000 long tons.....	2,240	12,000
Bituminous.....	1,000 long tons.....	1,112	3,000
Cordwood.....	1,000 cords.....	1,500	4,000
Corn.....	100,000 bushels.....	2,800	80,000
Crushed stone.....	5,000 tons.....	5,000	5,000
Fertilizers.....	4,200 tons.....	4,200	84,000
Fruit and farm produce.....	4,000 tons.....	4,000	60,000
Flour.....	1,200 barrels.....	120	7,200
Hay.....	500 tons.....	500	10,000
Lumber, all kinds.....	570,000 feet b. m.....	1,523	17,400
Oil, all kinds.....	1,000 barrels.....	175	10,000
Oysters, in shell.....	10,000 bushels.....	400	4,000
Oyster shells.....	400,000 bushels.....	12,000	8,000
Salt.....	600 tons.....	600	6,000
Wheat.....	140,000 bushels.....	4,200	160,000
Total		44,300	642,600

This is an increased tonnage of 301 over that reported for 1914.

8. TUCKAHOE RIVER, MD.

No dredging operations were carried on, but an examination of the channel was made which showed it to be in good condition.

APPROPRIATION.

July 25, 1912..... \$15,600

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	2	650	326
Sailing vessels.....	15	450	.....
Total.....	17	1,100	326

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	550 tons.....	550	\$22,000
Canned goods.....	6,800 cases.....	228	10,200
Coal, all kinds.....	95 long tons.....	106	665
Fish and oysters.....	130 tons.....	130	13,000
General merchandise.....	919 tons.....	919	91,900
Lumber, all kinds.....	66,000 feet b. m.....	115	1,650
Poultry and live stock.....	160 tons.....	160	32,000
Total.....		2,208	171,415

This is a decreased tonnage of 953 under that reported for 1914.

9. TILGHMAN ISLAND HARBOR, MD.

No field work was done during the fiscal year.

APPROPRIATION.

July 25, 1912..... \$7,820

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	7	2,380	4,480
Sailing and barges.....	50	1,500	.....
Launches.....	20	120	.....
Unregistered launches.....	(¹)	.....	.....
Total.....	77	4,000	4,480

¹ There are a small number of gasoline boats and sailing vessels engaged in the fishing and oystering business.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	290 tons.....	290	\$11,600
Building materials.....	70 tons.....	70	1,400
Cans, empty.....	60,000 cases.....	510	30,000
Canned goods.....	54,000 cases.....	1,809	81,000
Cordwood.....	330 cords.....	495	1,320
Coal:			
Anthracite.....	200 tons.....	200	1,400
Bituminous.....	400 tons.....	400	1,200
Crab meat.....	6,000 cans.....	19	3,000
Crabs:			
Hard.....	20,000 barrels.....	1,500	30,000
Soft.....	4,000 dozen.....	12	1,600
Fruit and farm produce.....	60 tons.....	60	1,200
Fertilizers.....	200 tons.....	200	4,000
Fish, fresh and salt.....	4,000 barrels.....	500	20,000
Flour.....	400 barrels.....	40	2,400
Groceries.....	100 tons.....	100	4,000
General merchandise.....	1,700 tons.....	1,700	170,000
Ice.....	700 tons.....	700	2,800
Lumber, all kinds.....	250,000 feet b. m.....	438	5,000
Oil, all kinds.....	300 barrels.....	53	3,000
Oysters, in shell.....	170,000 bushels.....	6,400	64,000
Oysters, shucked.....	8,000 gallons.....	40	6,400
Oyster shells.....	125,000 bushels.....	3,750	2,500
Poultry and live stock.....	260 tons.....	260	52,000
Total.....		19,546	499,820

This is a decreased tonnage of 787 under that reported for 1914.

10. TRED AVON RIVER, MD.

No dredging operations were carried on, but an examination of the channel was made, which showed it to be in good condition.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 568).....	\$6,000
Present project, July 25, 1912.....	9,200
Total.....	15,200

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	8	2,720	11,687
Sailing and barges.....	50	1,600	
Unregistered launches.....	100		
Total.....	158	4,220	11,687

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	380 tons.....	380	\$15,200
Cans, empty.....	300,000 cases.....	2,550	150,000
Canned goods.....	20,000 cases.....	670	30,000
Cement.....	300 tons.....	300	2,250
Cordwood.....	300 cords.....	450	1,200
Coal:			
Anthracite.....	2,800 long tons.....	2,912	15,600
Bituminous.....	3,100 long tons.....	3,472	9,300
Fertilizers.....	200 tons.....	200	4,000
Fish, fresh and salt.....	800 barrels.....	108	4,000
General merchandise.....	5,700 tons.....	5,700	570,000
Lumber, all kinds.....	543,000 feet b. m.....	950	10,880
Oysters, in shell.....	137,500 bushels.....	5,500	55,000
Oyster shells.....	75,000 bushels.....	2,250	2,250
Poultry and live stock.....	312 tons.....	312	62,400
Wheat.....	4,000 bushels.....	120	4,000
Total.....		25,872	936,080

This is an increased tonnage of 12,487 over that reported for 1914.

11. SLAUGHTER CREEK, MD.

No field work was done during the fiscal year.

APPROPRIATION.

July 25, 1912..... \$4,140

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	3	1,370	13,000
Sailing and barges.....	40	1,600	
Power boats.....	5	45	
Unregistered launches.....	(1)		
Total.....	48	3,015	13,000

¹ There are a number of launches and sailing vessels used in this creek in oystering.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	135 tons.....	135	\$5,400
Building materials.....	150 tons.....	180	2,700
Cans, empty.....	50,000 cases.....	425	25,000
Canned goods.....	50,000 cases.....	1,675	75,000
Coal, anthracite.....	250 long tons.....	280	1,750
Corn.....	5,000 bushels.....	150	4,000
Cordwood.....	2,000 cords.....	3,000	8,000
Crabs, hard.....	5,000 barrels.....	250	7,500
Fish, fresh and salt.....	7,200 barrels.....	900	72,000
Fertilizers.....	375 tons.....	375	7,500
Fruit and farm produce.....	100 tons.....	100	2,000
General merchandise.....	8,450 tons.....	8,450	845,000
Hay and feed.....	100 tons.....	100	2,000
Lumber, all kinds.....	1,000,000 feet b. m.	1,750	20,000
Oysters, in shell.....	55,000 bushels.....	2,200	22,000
Oysters, shucked.....	20,000 gallons.....	100	16,000
Oyster shells.....	30,000 bushels.....	900	900
Piling.....	1,200 number.....	900	9,000
Wheat.....	30,000 bushels.....	900	30,000
Total.....		22,800	1,156,350

¹ This is a decreased tonnage of 8,590 under that reported for 1914.

12. NANTICOKE RIVER, DEL. AND MD., AND NORTHWEST FORK OF NANTICOKE RIVER, MD.

(A) NANTICOKE RIVER, DEL. AND MD.

No field work was done during the fiscal year.

APPROPRIATIONS.

Aug. 18, 1894.....	\$5,000	June 25, 1910.....	\$12,960
June 3, 1896.....	3,000	Feb. 27, 1911.....	36,000
Mar. 3, 1899.....	8,000	July 25, 1912.....	5,000
Mar. 3, 1905.....	2,000	Mar. 4, 1918.....	3,900
Mar. 2, 1907.....	2,000	July 27, 1916.....	5,000
Mar. 3, 1909 (allotted Mar. 29, 1909).....	2,000	Total.....	79,560

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	8	2,100	4,658
Sailing and barges.....	98	9,765	.....
Unregistered launches.....	1,800	.....	.....
Total.....	406	11,865	4,658

¹ This appropriation was for improving Broad Creek River, Del., but under the terms of the act, was applied to removing bar on Nanticoke River, at Seaford, Del.

² Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	3,650 tons.....	3,650	\$146,000
Box shooks and baskets.....	25,000.....	25	325
Berry crates.....	31,000.....	155	9,300
Building materials.....	700 tons.....	700	14,000
Cans, empty.....	30,000 cases.....	255	15,000
Canned goods.....	107,000 cases.....	3,585	160,500
Coal:			
Anthracite.....	1,500 long tons.....	1,680	9,000
Bituminous.....	1,900 long tons.....	2,128	5,700
Cordwood.....	800 cords.....	1,200	3,200
Fertilizers.....	3,000 tons.....	3,000	60,000
Fruit and farm produce.....	80 tons.....	80	1,600
General merchandise.....	5,350 tons.....	5,350	535,000
Gum logs.....	550,000 log feet.....	3,025	11,000
Lumber, all kinds.....	4,350,000 feet b. m.....	8,438	97,000
Oysters, in shell.....	57,500 bushels.....	3,500	35,000
Oyster shells.....	20,000 bushels.....	600	600
Poultry and live stock.....	920 tons.....	920	184,000
Total.....		38,341	1,287,525

This is a decreased tonnage of 703 under that reported for 1914

(B) NORTHWEST FORK OF NANTICOKE RIVER (MARSHYHOPE CREEK), MD.

No field work was done during the fiscal year.

APPROPRIATIONS.

Appropriations for this work are included with those listed under Nanticoke River proper.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing and barges.....	12	340
Launches.....	10	90
Unregistered launches.....	30	.....
Total.....	52	930

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Bricks, all kinds.....	100,000.....	200	\$1,000
Cans, empty.....	88,000 cases.....	743	44,000
Canned goods.....	100,000 cases.....	3,360	150,000
Cordwood.....	1,300 cords.....	2,050	5,200
Coal, all kinds.....	680 long tons.....	725	3,250
Corn.....	2,500 bushels.....	75	2,000
Fertilizers.....	1,700 tons.....	1,700	34,000
General merchandise.....	125 tons.....	125	12,500
Hay and feed.....	45 tons.....	45	900
Lumber, all kinds.....	1,000,000 feet b. m.....	1,750	20,000
Oyster shells.....	56,000 bushels.....	1,680	1,680
Sand and gravel.....	75 tons.....	75	75
Wheat.....	25,000 bushels.....	750	25,000
Total.....		12,298	299,605

This is an increased tonnage of 229 over that reported for 1914.

13. BROAD CREEK RIVER, DEL.

No field work was done during the fiscal year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 414) -- '\$57, 500
Present project:

July 25, 1912.....	\$14, 520	
Mar. 4, 1913.....	2, 000	
July 27, 1916.....	1, 500	
		18, 020
Total		75, 520

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers and tugs.....	6	272
Sailing and barges.....	54	4, 560
Launches.....	10	110
Unregistered launches.....	40	
Total.....	110	4, 942

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Bricks, all kinds.....	40,000.....	80	\$280
Coal, all kinds.....	660 long tons.....	739	2, 640
Cordwood.....	720 cords.....	1, 090	2, 890
Fertilizer.....	3,060 tons.....	3, 050	61, 000
Gum logs.....	1,236,763 log feet.....	8, 095	20, 405
General merchandise.....	2,000 tons.....	2, 000	200, 000
Ice.....	250 tons.....	250	1, 250
Laths.....	90,000.....	10	260
Lumber, all kinds.....	1,217,737 feet b. m.....	21, 310	17, 957
Oyster shells.....	6,000 bushels.....	180	240
Potatoes.....	10,000 bushels.....	300	5, 000
Shingles.....	108,600.....	27	982
Total.....		37, 114	312, 845

This is an increased tonnage of 6,553 over that reported for 1914.

14. TWITCH COVE AND BIG THOROUGHFARE RIVER MD.

No field work was done during the fiscal year.

APPROPRIATION.

July 25, 1912..... \$2, 900

¹ Not including the appropriation of \$5,000 by the act of Aug. 18, 1894, which, under the terms of the act, was applied to removing bar on Nanticoke River, at Seaford, Del.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Sailing.....	100	3,000	.....
Power boats.....	15	90	800
Unregistered launches.....	1 300	.....	.....
Total.....	415	3,090	800

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Berries.....	100 crates.....	2	\$200
Bricks.....	5,000.....	10	50
Building materials.....	50 tons.....	50	1,000
Cans, empty.....	15,000 cases.....	128	7,500
Canned goods.....	12,000 cases.....	402	18,000
Coal, anthracite.....	50 tons.....	50	350
Corn.....	500 bushels.....	15	400
Clams.....	25,000.....	4	125
Crabs:			
Hard.....	10,000 barrels.....	750	15,000
Soft.....	155,000 dozen.....	450	60,000
Cordwood.....	50 cords.....	75	300
Fish, fresh and salt.....	500 barrels.....	63	5,000
Flour.....	200 barrels.....	20	1,200
General merchandise.....	900 tons.....	900	45,000
Ice.....	200 tons.....	200	800
Lumber, all kinds.....	50,000 feet b. m.....	88	1,000
Oysters, in shell.....	40,000 bushels.....	1,600	16,000
Oysters, shucked.....	10,000 gallons.....	50	8,000
Oyster shells.....	10,000 bushels.....	300	200
Potatoes.....	400 bushels.....	12	240
Salt.....	50 tons.....	50	800
Wheat.....	300 bushels.....	18	300
Total.....		5,237	181,066

This is an increased tonnage of 188 over that reported for 1914.

15. CRISFIELD HARBOR, MD.

No field work was done during the fiscal year.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 437) -- \$37,817.50
Present project:

Mar. 2, 1907.....	\$37,707.00	
June 25, 1910.....	10,055.00	
July 25, 1912.....	5,000.00	
		52,762.00
Total.....		90,079.50

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers and tugs.....	20	9,000	15,022
Sailing and barges.....	580	46,400	.....
Launches.....	70	630	.....
Unregistered launches.....	1,650	.....	.....
Total.....	1,320	56,330	15,022

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Agricultural products.....	480 tons.....	480	\$28,400
Berries.....	120,000 crates.....	2,400	240,000
Bricks.....	2,000,000.....	4,000	16,000
Cans, empty.....	50,000 cases.....	125	25,000
Canned goods.....	60,000 cases.....	2,010	90,000
Cement.....	25,000 barrels.....	5,000	50,000
Clams.....	20,000,000.....	2,500	100,000
Coal:			
Anthracite.....	2,000 tons.....	2,000	12,000
Bituminous.....	1,500 tons.....	1,500	4,500
Corn.....	10,000 bushels.....	300	8,000
Cordwood.....	1,000 cords.....	1,500	4,000
Crabs:			
Hard.....	50,000 barrels.....	3,750	75,000
Soft.....	2,000,000 dozen.....	6,000	800,000
Fruit and farm produce.....	4,000 tons.....	4,000	80,000
Fertilizers.....	5,000 tons.....	5,000	100,000
Fish, fresh, and salt.....	8,000,000 pounds.....	4,000	320,000
General merchandise.....	9,300 tons.....	9,300	930,000
Lime.....	3,000 barrels.....	300	3,000
Lumber.....	6,600,000 feet b. m.....	11,550	132,000
Oysters, in shell.....	5,000,000 bushels.....	200,000	2,000,000
Oyster shells.....	2,000,000 bushels.....	60,000	40,000
Oils, all kinds.....	5,000 barrels.....	875	50,000
Potatoes.....	10,000 bushels.....	280	5,000
Poultry and live stock.....	290 tons.....	290	58,000
Salt.....	5,000 bushels.....	175	1,750
Sand and gravel.....	30,000 tons.....	30,000	15,000
Total.....		357,335	5,197,650

This is an increased tonnage of 37,145 over that reported for 1914.

There were 4 sail vessels with a tonnage of 150, value \$16,500, and 8 gasoline boats, with a tonnage of 191, value \$46,100, built at Crisfield, Md., in the year 1915.

Crisfield is a subport of entry of the port of Baltimore, and last year the number of vessels documented were as follows:

	Number.	Tons.
Sailing vessels.....	550	9,328
Gasoline boats.....	65	853
Barges.....	2	64
Total.....	617	10,765

16. LOWER THOROUGHFARE AT OR NEAR WENONA, DEAL ISLAND, MD.

No field work was done during the fiscal year.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 440)-----	\$5,000
Present project:	
June 25, 1910-----	\$5,800
July 25, 1912-----	2,000
	<hr/> 7,800
Total-----	<hr/> 12,800

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered sailing.....	80	1,200
Unregistered sailing and launches.....	¹ 130	.....
Total.....	210	1,200

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Bricks, all kinds.....	40,000.....	80	\$400
Building materials.....	280 tons.....	280	5,000
Cans, empty.....	55,000 cases.....	468	27,500
Canned goods.....	45,000 cases.....	1,502	67,500
Coal, anthracite.....	800 long tons.....	896	5,000
Crabs, hard.....	7,000 barrels.....	525	10,500
Crabs, soft.....	26,000 dozen.....	108	14,400
Cordwood.....	2,000 cords.....	3,000	8,000
Flour.....	600 barrels.....	60	3,000
General merchandise.....	320 tons.....	320	32,000
Lumber.....	30,000 feet b. m.....	53	600
Oysters, in shell.....	100,000 bushels.....	4,000	40,000
Oyster shells.....	75,000 bushels.....	2,250	2,250
Potatoes.....	600 bushels.....	38	480
Total.....	.....	12,580	218,430

This is an increased tonnage of 996 over that reported for 1914.

17. BROAD CREEK, MD.

Dredging under contract for improvement was in progress at the close of the fiscal year. The amount of material removed was 114,246 cubic yards, and consisted of mud and heavy clay, which was pumped

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on the adjoining marsh lands. During the year 53 per cent of the project was completed, making the total of 87 per cent completed at the end of the fiscal year. Owing to the presence of heavy material, stumps, and an inadequate plant the work has been delayed beyond the date originally set for completion.

APPROPRIATION.

July 25, 1912.....	\$57, 200
Transferred under river and harbor act of Mar. 4, 1915.....	20, 000
Total.....	87, 200

CONTRACT IN FORCE.

Contract with the Sanford & Brooks Co. for dredging an estimated quantity of 190,000 cubic yards of material at 7.9 cents per cubic yard, approved August 13, 1914; commenced November 12, 1914; date fixed for completion, April 14, 1915, extended by authority of the Chief of Engineers for a reasonable period.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered sailing vessels.....	200	3, 000
Unregistered sailing vessels and launches.....	¹ 400	.....
Total.....	600	3, 000

¹ Approximated.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Clams.....	3,000,000.....	375	\$15, 000
Cordwood.....	100 cords.....	150	400
Crabs, hard.....	1,000 barrels.....	75	1, 500
Crabs, soft.....	200,000 dozen.....	600	80, 000
Fish, fresh and salt.....	5,000 barrels.....	668	50, 000
Flour.....	400 barrels.....	40	2, 400
Groceries.....	100 tons.....	100	2, 000
Oysters, in shell.....	200,000 bushels.....	8, 000	80, 000
Oysters, shucked.....	100,000 gallons.....	500	80, 000
Oyster shells.....	100,000 bushels.....	3, 000	3, 000
Total.....	.....	12, 508	\$14, 300

This is a decreased tonnage of 26,523 under that reported for 1914, said to be partially due to necessary interruption to traffic by dredging operations.

IMPROVEMENT OF RIVERS AND HARBORS IN THE WASHINGTON, D. C. DISTRICT.

REPORT OF LIEUT. COL. C. A. F. FLAGLER, CORPS OF ENGINEERS.

IMPROVEMENTS.

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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 469 TO 493.

1. POTOMAC RIVER AT WASHINGTON, D. C.

The work of restoring the training dike for the Virginia Channel where settlement had occurred and the placing of earthen embankment back of it was begun on July 16, 1915, and was in progress on June 30, 1916. This work consisted in placing 1,880.9 cubic yards of riprap on 1,548 linear feet of the lower end of the dike, and in building 5,052 linear feet of earthen embankment along the back of the stone dike for its entire length. The earthen embankment is about 18 feet wide and has an elevation of 5 feet above mean low water. The embankment work was done partly by contractors' plant under public notices, and partly by Government plant, derrick boat *Atlas*. By the first method clamshell dredge *W. A. Smoot No. 3*, owned by the Smoot Sand & Gravel Corporation, was in operation 114 $\frac{1}{2}$ hours, and excavated and placed 10,391 cubic yards of material in the embankments, and clamshell dredge *Daniel*, owned by the Dorsey & Miller Co., was in operation 132 $\frac{1}{2}$ hours and excavated and placed 10,992 cubic yards of material in the embankments. By the latter method the *Atlas* was in operation 79 $\frac{1}{2}$ hours, and excavated and deposited 6,515 cubic yards of material in the embankments.

The work on the foundations for the new location of the sea wall in the vicinity of the western limits of Potomac Park was begun on October 14, 1915, and was completed on June 13, 1916. The work consisted in digging a trench to receive the riprap foundations. This work was done under public-notice order by clamshell dredge *W. A. Smoot No. 3*. The dredge was in operation 29 $\frac{1}{2}$ hours and

excavated 8,140 cubic yards of material over a distance of 1,140 linear feet. The excavated material was deposited immediately shoreward of the trench, thereby forming an embankment. Between November 16, 1915, and March 29, 1916, 7,729.2 cubic yards of riprap were placed in this trench, thereby completing the foundations. The embankment work was carried to a greater height by the clamshell dredge *Daniel*, working under public-notice order for 63½ hours, in which time 5,087 cubic yards of material was excavated and placed on 1,096 linear feet of embankments. During April and May the derrick boat *Atlas* raised the embankments twice for the full length of 1,140 linear feet. During this period the *Atlas* was in operation 90½ hours and excavated 7,252 cubic yards of material. The riprap foundations and embankments are now ready for the building of the masonry sea wall.

Scows 4, 5, and 8 were repaired, calked, and painted during March and April, 1916. Snag boat *York* and scow *No. 7* were repaired, calked, and painted during June.

There were no freshets of any consequence during the fiscal year. On August 3, 1915, an unusually heavy northeast wind storm caused a wind tide of 7 feet above mean low water. This elevation is 4 feet above mean high tide. No damage was done by the storm.

The expenditures during the fiscal year, \$19,961.09, were applied to maintenance of the improvement, and are distributed as follows: Repairs to training dike, \$3,789.26; new sea wall near the western limits of Potomac Park, \$11,931.42; maintenance of U. S. tug *Castle*, \$1,340.24; maintenance and operation of tidal gates, repairs to floating plant, and care of property, \$1,316.30; and engineering, clerical, maintenance of office, and miscellaneous expenses, \$1,583.87.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 530)		\$339, 766. 00
Present project:		
Aug. 2, 1882	-----	\$400, 000. 00
July 5, 1884	-----	500, 000. 00
Aug. 5, 1886	-----	375, 000. 00
Aug. 11, 1888	-----	300, 000. 00
Sept. 19, 1890	-----	260, 000. 00
July 13, 1892	-----	200, 000. 00
Aug. 13, 1894	-----	150, 000. 00
June 3, 1896	-----	100, 000. 00
Mar. 3, 1899	-----	74, 000. 00
June 13, 1902	-----	75, 000. 00
Apr. 23, 1904 (allotted June 10, 1904)	-----	50, 000. 00
Mar. 3, 1905	-----	50, 000. 00
Mar. 2, 1907	-----	258, 000. 00
Mar. 3, 1909 (allotted Mar. 23, 1909)	-----	25, 000. 00
June 25, 1910	-----	180, 000. 00
Feb. 27, 1911	-----	60, 000. 00
July 25, 1912	-----	40, 000. 00
Mar. 4, 1913	-----	30, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)	-----	10, 000. 00
Mar. 4, 1915 (allotted Apr. 2, 1915)	-----	20, 000. 00
July 27, 1916	-----	32, 000. 00
		<hr/> 3, 189, 000. 00
Total	-----	<hr/> 3, 528, 766. 00

¹ Appropriation of \$100,000, of which \$26,000 was allotted June 3, 1899, to Potomac River below Washington.

Carried to surplus fund (previous projects).....	\$291. 89
	8, 528, 475. 21
Amount received from sale of condemned property.....	\$587. 51
Amount received from sale of blue prints.....	5. 02
Amount received from judgment recovered.....	285. 71
Total from other sources for present project.....	778. 24
Grand total.....	8, 529, 258. 45

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	5, 117	1, 259, 057	544, 240
Sailing.....	1, 073	34, 630	
Barges.....	143	56, 240	
Unregistered:			
Canal boats.....	776	1 62, 856	
Scoows.....	2, 841	1 812, 400	
Total.....	9, 954	1, 728, 183	544, 240

¹ Estimated.

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	
Beer.....	1, 150 tons.....	1, 150	\$41, 064		
Brick.....	4, 040, 000.....	15, 120	28, 400	33	(¹)
Canned goods.....	31, 600 cases.....	1, 060	47, 240		
Cement and lime.....	3, 500 barrels.....	600	3, 300	33	(¹)
Coal.....	149, 907 tons.....	167, 896	560, 769	240	
Cordwood.....	14, 282 cords.....	27, 498	64, 270		
Crabs and crab meat.....	530 tons.....	530	38, 400		
Fertilizer.....	2, 744 tons.....	2, 744	49, 892		
Fish.....	2, 696 tons.....	2, 696	266, 700		
General merchandise.....	54, 045 tons.....	54, 045	8, 054, 000		
Laths.....	7, 988, 350.....	2, 396	27, 968	430	80. 0080
Lumber.....	10, 681, 950 feet b. m.....	19, 425	196, 960		
Manure.....	6, 000 tons.....	6, 000	6, 000	33	(¹)
Melons.....	1, 940 tons.....	1, 940	27, 400		
Oil, gas.....	6, 889, 945 gallons.....	24, 804	221, 732	213	. 0017
Oil, kerosene.....	1, 475 barrels.....	330	50, 058	196	
Oysters and clams.....	271, 800 bushels.....	10, 822	156, 270		
Oysters, shucked.....	13, 280 gallons.....	66	11, 950		
Oyster shells.....	68, 200 bushels.....	3, 360	3, 880	6	
Peanuts.....	5, 056 sacks.....	269	27, 895	196	. 0230
Railroad ties.....	60, 750.....	6, 075	37, 626		
Sand and gravel.....	336, 180 tons.....	336, 180	104, 850		
Shingles.....	527, 950.....	175	4, 224	365	. 0059
Stones.....	56, 014 tons.....	56, 014	48, 878		
Total.....		741, 170	10, 138, 231		

¹ Carried by District of Columbia scoows.

2. ANACOSTIA RIVER, D. C.

Dredging work under contract with the Cape May Dredging Co., which was in progress at the close of the past fiscal year, was suspended on July 9, 1915, on account of the wreckage, consisting of piers, piles, riprap stone, etc., of two old bridges in the vicinity of the Anacostia Bridge. The removal of this class of material was not covered by the contract. During the period, the work was prosecuted continuously day and night, except for delays incidental to this class of work, by the 20-inch hydraulic dredge *Nelson Z. Graves*. The dredge was in operation 7 days, 103 $\frac{1}{2}$ hours, and excavated 89,897 cubic yards of material at the average daily output of 12,842 cubic yards, an average hourly output of 864 cubic yards. The total dredging under this contract, including what had been done in the fiscal year 1915, amounted to 598,930 cubic yards. Resulting from this dredging, the channel was completed to within 200 feet of the Anacostia Bridge, and the excavated material was deposited through discharge pipes upon section C of Anacostia Flats. Section C was reclaimed by the deposit to a height of about 4 feet above mean low water. The cost per cubic yard as named in the contract was 5 cents, and the cost including inspection, office, and incidental expenses, was about 5.327 cents, making the total cost \$31,904.99, of which \$14,551.14 was expended during the fiscal year 1915, and \$9,772.58 was expended during the fiscal year 1916. The sum of \$7,581.27 is still outstanding, payment being withheld by direction of the Chief of Engineers.

The portion of the channel from 200 feet below the Anacostia Bridge to the Anacostia Bridge, which had been omitted from the Cape May Dredging Co.'s contract on account of the reasons given above, was awarded under public-notice order dated June 10, 1915, to the Dorsey & Miller Co. Dredging under this order was begun by the clamshell dredge *Daniel*, on August 30, and was completed on December 29, 1915. Two dump scows and a small tugboat, in addition to the dredge, were used on the work. The dredge *Daniel* was in operation 655 $\frac{1}{2}$ hours, and removed the six old piers of the Navy Yard Bridge which had been dismantled in 1908, and the mud between the site of the Old Navy Yard Bridge and the bridge which antedated the Navy Yard Bridge. Several piers of the latter bridge were also removed. Resulting from these operations, 291 piles and timbers were drawn and removed, 583 cubic yards of riprap, and 24,093 cubic yards of mud were excavated, placed in dump scows, and deposited in front of the training dike, Virginia Channel, and back of the Anacostia sea wall. At the former place, 18,234 cubic yards were deposited, and at the latter place, 6,422 cubic yards were deposited. In addition to the above work, the U. S. snag boat *York* and a submarine diver, between December 14 and 16, drew and disposed of 20 piles from the second Navy Yard Bridge pier from the city side.

Dredging under contract with the Maryland Dredging & Contracting Co., dated January 3, 1916, was begun by a small force of men in the construction of levees and wasteweirs, on February 28, and actual dredging operations were begun on March 23. Since that date the work has been prosecuted continuously day and

night, except for delays incidental to this class of work, by the 15-inch hydraulic dredge *Potomac*. The dredge was in operation 85 days, 1,644½ hours, and excavated 322,580 cubic yards of material. The daily average output was 3,795 cubic yards, and the hourly average output was 196.1 cubic yards. The excavated material was deposited through discharge pipes on section C of the Anacostia Flats, which has been raised by this deposit to height of 6½ feet above mean low water. The dredging under this contract is now about 58 per cent completed. The cost per cubic yard, as named in the contract, was 5½ cents, and the cost, including the inspection, office, and incidental expenses, was about 6 cents. The total expenditure for this work to the end of the year was \$13,479.65. The work done during June has not yet been paid for.

During September 154 linear feet of masonry sea wall was constructed along the left bulkhead line just west of the Chicago Street sewer, and during November 122 linear feet of masonry sea wall constructed at Buzzards Point to prevent erosion of the bank upon the riprap foundations which had been placed in the previous year. During December and January Stickfoot Branch and Elizabeth Branch were cleaned out by a small force of men.

The total expenditure during the fiscal year, \$38,032.10, was applied to the improvement, and is distributed as follows: Dredging under contract with the Cape May Dredging Co., \$9,772.58; dredging under order with Dorsey & Miller Co., \$7,558.81; dredging under contract with the Maryland Dredging & Contracting Co., \$13,479.65; masonry sea-wall construction, \$1,007.90; payment made for riprap delivered and placed during last fiscal year, \$305.18; cleaning out Stickfoot and Elizabeth Branches, \$234.37; maintenance of U. S. tug *Castle*, \$514.88; care of property and repairs to floating plant, \$2,109.33, and engineering, clerical, maintenance of office, and miscellaneous expenses, \$3,049.40.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 396)		\$22,000.00
Existing project:		
June 13, 1902	\$150,000.00	
Mar. 2, 1907	127,000.00	
Mar. 3, 1909 (allotted Mar. 23, 1909)	10,000.00	
June 25, 1910	230,000.00	
Feb. 27, 1911	200,000.00	
July 25, 1912	50,000.00	
Mar. 4, 1913	75,000.00	
		842,000.00
Total		864,000.00
Amount received from sale of steamer <i>General Warren</i>	500.00	
Amount received from sales	32.50	
Total from other sources for present project		532.50
		864,532.50

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CONTRACTS IN FORCE.

DREDGING.

Contractor: Nelson Z. Graves, proprietor Cape May Dredging Co., Philadelphia, Pa.

Date of contract: May 23, 1914.

Date of approval: June 23, 1914.

Date fixed for commencement: July 8, 1914, extended to March 15, 1915.

Rate required: 50,000 cubic yards per month for each machine employed during first month; 80,000 cubic yards per month for each machine employed during the succeeding months to completion.

Amount of contract: 657,000 cubic yards.

Unit price: 5 cents per cubic yard.

Completed on July 9, 1915.

Contractor: Maryland Dredging & Contracting Co., Baltimore, Md.

Date of contract: January 3, 1916.

Date of approval: January 8, 1916.

Date fixed for commencement: February 11, 1916, extended to March 16, 1916.

Rate required: 50,000 cubic yards per month for each machine employed during first month; 80,000 cubic yards per month for each machine employed during the succeeding months to completion.

Amount of contract: 500,000 cubic yards.

Unit price: 5½ cents per cubic yard.

Completed at end of fiscal year: 55 per cent.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers ¹	2,372	143,820	* 18,465
Sailing.....	204	7,228	.....
Barges.....	37	18,544	.....
Unregistered:			
Canalboats.....	111	* 8,880	.....
Scows.....	2,078	* 311,700	.....
Rafts.....	20	.....	.....
Total	4,622	490,172	18,465

¹ Includes 1,392 Government vessels; estimated registered tonnage of 120,160.

* Carried by Government vessels.

* Estimated.

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	
Asphalt.....	225 tons.....	225	\$3,476	24	(¹)
Brick.....	930,000.....	2,332	11,743	24	(¹)
Brick clay.....	43,344 tons.....	43,344	43,344	10	(²)
Cement and lime.....	3,570 barrels.....	671	6,710	24	(¹)
Coal.....	13,026 tons.....	14,589	45,296	.....	.....
Cordwood.....	5,070 cords.....	8,873	22,815	60	\$0.0123
Gravel and sand.....	124,500 tons.....	124,500	62,314	.....	(²)
Iron and steel.....	668 tons.....	668	40,079	24	(¹)
Lumber.....	1,716 tons.....	1,716	24,085	24	(¹)
Manufactured iron and steel.....	237 tons.....	237	41,471	24	(¹)
Oil.....	4,578,210 gallons.....	14,801	356,510	213	.0017
Piles.....	4,000.....	3,600	20,000	.....	.....
Stone.....	29,014 tons.....	29,014	32,873	.....	.....
Total.....	.....	244,570	711,726	.....	.....
Naval ordnance and supplies.....	20,559 tons.....	¹ 20,559	15,474,479	24	(¹)
Powder and powder-making supplies and apparatus.....	11,962 tons.....	11,962	2,792,365	24	(¹)
Miscellaneous.....	696 tons.....	696	481,662	24	(¹)
Total.....	.....	33,217	18,718,506	.....	.....
Grand total.....	.....	277,787	19,430,232	.....	.....

¹ Hauled in Government vessels; no freight paid.² Hauled in private vessels; no freight paid.³ Of this amount 9,099 tons, valued at \$6,758,644, were hauled to Indianhead proving grounds from Washington Navy Yard and returned.

3. POTOMAC RIVER AT ALEXANDRIA, VA.

No work, except a survey made in June, 1916, was done at this locality during the fiscal year. The survey showed considerable shoaling in the upper portion of the improvement.

The expenditure, \$916.47, was applied to maintenance of the improvement, and is distributed as follows: Survey, \$219.67; maintenance of U. S. tug *Castle*, \$263.56; engineering, clerical, maintenance of office, care of property, and miscellaneous expenses, \$433.24.

APPROPRIATIONS.

June 25, 1910.....	\$60,000
Feb. 27, 1911.....	56,000
Total.....	116,000

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	2,824	1,379,274	12,340
Sailing.....	286	10,178	.....
Barges.....	51	20,985	.....
Unregistered:			
Canal boats.....	185	12,400	.....
Scows.....	204	.....	.....
Total.....	3,610	1,422,837	12,340

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	
Barrels.....	10,100	340	\$18,600	.....	.....
Bear.....	11,500 packages.....	909	35,640	.....	.....
Bottles.....	660 tons.....	660	49,100	187	\$0.0160
Brick.....	140,000.....	350	1,400	196	.0182
Canned goods.....	35,200 cases.....	1,175	52,000	.....	.....
Cement and lime.....	2,400 barrels.....	370	3,545	.....	.....
Coal.....	17,619 tons.....	19,733	63,430	.....	.....
Cordwood.....	980 cords.....	1,715	3,965	.....	.....
Farm produce.....	570 tons.....	570	19,760	.....	.....
Fertilizer.....	13,575 tons.....	13,575	219,062	.....	.....
Fertilizer materials:					
Ores, pyrites.....	4,842 tons.....	4,842	24,000	407	.....
Phosphate rock.....	13,650 tons.....	13,650	88,725	1,400	.0014
Miscellaneous.....	6,116 tons.....	6,116	44,065	206	.0038
Fish, fresh and salt.....	5,000 barrels.....	600	33,000	.....	.....
General merchandise.....	15,049 tons.....	15,049	2,142,890	.....	.....
Gravel.....	8,723 cubic yards.....	11,778	5,670	.....	.....
Hay, feed and meal.....	1,247 tons.....	1,247	22,759	.....	.....
Ice.....	540 tons.....	540	4,320	.....	.....
Laths.....	1,400,000.....	420	5,600	.....	.....
Lumber.....	1,280,000 feet, b. m.....	2,110	30,100	.....	.....
Melons.....	15,000.....	50	1,000	.....	.....
Miscellaneous.....	413 tons.....	413	34,488	.....	.....
Oil:					
Coal, etc.....	802,879 gallons.....	2,710	37,198	206	.0019
Gasoline.....	407,765 gallons.....	1,240	39,002	206	.0019
Other building materials.....	382 tons.....	382	21,226	.....	.....
Oysters and clams.....	15,000 bushels.....	600	12,500	.....	.....
Plaster.....	1,000 tons.....	1,000	18,000	.....	.....
Potatoes.....	52,500 bushels.....	1,575	38,150	.....	.....
Pulp wood.....	7,000 cords.....	12,600	40,250	.....	.....
Sand.....	17,446 cubic yards.....	21,808	8,720	.....	.....
Shingles.....	560,000.....	165	4,175	.....	.....
Vinegar.....	4,625 packages.....	289	8,379	193	.0143
Total.....		138,680	3,121,869	.....	.....

4. POTOMAC RIVER AT LOWER CEDAR POINT, MD.

A survey was made during November of the channel under improvement. Resulting from this survey it was ascertained that the channel had shoaled considerably in places. The funds in hand are not sufficient to restore the channel depths and will therefore be retained until a further appropriation is made.

The expenditure during the fiscal year, \$282.99, was applied to maintenance, and is distributed as follows: Making and plotting survey, \$179.77; maintenance of U. S. tug *Castle*, \$103.22.

APPROPRIATIONS.

June 25, 1910.....	\$13, 800
Mar. 4, 1913.....	3, 000
Total	16, 800

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered steamers.....	636	314, 136	757

Impossible to secure data on arrival of sailing vessels.

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Coal.....	50 tons.....	56	\$360	58	\$0.0259
Cordwood.....	150 cords.....	263	480	62	.0130
Farm produce.....	280 tons.....	280	20, 800		
Fertilizer.....	400 tons.....	400	7, 800		
General merchandise.....	626 tons.....	626	68, 880		
Hay.....	100 tons.....	100	1, 800	58	.0388
Live stock.....	1, 300 head.....	143	22, 700		
Lumber.....	200,000 feet, b. m.....	350	3, 600		
Other building materials.....	500 tons.....	500	15, 000		
Total		2, 698	141, 400		

5. UPPER MACHODOC CREEK, VA.

No work was done and no expenditure made at this locality during the fiscal year. There were no funds available.

APPROPRIATIONS.

June 25, 1910.....	\$10, 000
Feb. 27, 1911.....	13, 200
Mar. 4, 1913.....	3, 200
Total	26, 400

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	208	72,728	500
Sailing.....	88	3,540	.....
Barges.....	3	1,203	.....
Total.....	299	77,471	500

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	
Cordwood.....	1,900 cords.....	3,230	\$6,175	65	\$0.0123
Farm produce.....	720 tons.....	720	39,750	65	.....
Fertilizer.....	330 tons.....	330	5,940	57	.0219
General merchandise.....	840 tons.....	840	107,600	.....	.....
Live stock.....	960 head.....	76	10,640	.....	.....
Lumber.....	260,000 feet b. m.....	500	3,500	.....	.....
Miscellaneous.....	220 tons.....	220	13,200	.....	.....
Oil and gasoline.....	380 barrels.....	76	2,600	.....	.....
Peas.....	1,200 bushels.....	36	3,000	57	.0223
Pulpwood.....	1,500 cords.....	3,000	8,250	57	.....
Railroad ties.....	25,000.....	2,500	15,000	65	.0122
Total.....	.....	11,528	215,655	.....	.....

6. NOMINI CREEK, VA.

The repairs to the riprap jetty at the entrance to Nomini Creek, begun on July 30, were completed on August 14. During this period work was done on July 30, July 31, August 13, and August 14. The repairs consisted in placing 156 cubic yards of riprap purchased under public notice order at \$2.72 $\frac{1}{2}$ —\$425.10—on the outer 450 feet of the jetty; in placing about 50 cubic yards of riprap, obtained from portions of the jetty having the protection of vegetation, along the contiguous 320 feet of the jetty, and in replacing about 10 cubic yards of riprap which had been knocked off the jetty. Resulting from the work, the jetty is now in first-class condition, and no work during the ensuing fiscal year, 1917, is contemplated.

The total expenditure during the fiscal year—\$600—was applied to maintenance of the improvement, and is distributed as follows: Repairs to jetty, \$465.37; maintenance of U. S. tug *Castle*, \$100; engineering, clerical, and maintenance of office, \$34.63.

APPROPRIATIONS.

Mar. 3, 1873.....	\$10,000	Mar. 3, 1899.....	\$10,000
June 23, 1874.....	6,000	Mar. 3, 1905.....	4,000
Mar. 3, 1875.....	5,000	Mar. 2, 1907.....	5,000
Mar. 3, 1879.....	2,500	Mar. 3, 1909 (allotted Mar. 23,	
June 14, 1880.....	5,000	1909).....	4,000
Mar. 3, 1881.....	2,000	June 25, 1910.....	5,000
Aug. 2, 1882.....	2,000	Feb. 27, 1911.....	8,000
Aug. 11, 1888.....	5,000	Mar. 4, 1913 (allotted June 22,	
Sept. 19, 1890.....	5,000	1915).....	600
July 13, 1892.....	10,000		
Aug. 18, 1894.....	5,000	Total.....	96,600
June 3, 1896.....	2,500		

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	477	137,760	4,000
Sailing.....	173	7,521	
Barges.....	4	1,600	
Total.....	654	146,881	4,000

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Brick.....	40,000.....	110	\$400		
Canned goods.....	9,950 cases.....	348	14,925		
Coal.....	180 tons.....	202	990		
Cordwood.....	2,000 cords.....	3,200	6,500	87	\$0.0110
Farm produce.....	1,680 tons.....	1,680	94,800	87	
Fertilizer.....	1,105 tons.....	1,105	19,890	81	.0154
Fish and oysters.....	240 tons.....	240	6,600	87	
General merchandise.....	2,113 tons.....	2,113	232,430	84	
Grain.....	9,420 bushels.....	283	7,588		
Hay and feed.....	300 tons.....	300	6,300		
Ice.....	120 tons.....	120	960		
Lime and cement.....	1,950 barrels.....	290	2,900		
Live stock.....	1,560 head.....	165	17,000		
Lumber.....	520,000 feet, b. m.....	1,040	6,760		
Oil and gasoline.....	410 barrels.....	82	3,440		
Other building materials.....	250 tons.....	250	5,100		
Pulpwood.....	2,500 cords.....	5,000	13,750		
Railroad ties.....	25,000.....	2,500	12,500		
Total.....		13,928	451,831		

7. MATTAPONI AND PAMUNKEY RIVERS, OCCOQUAN AND AQUIA CREEKS, VA.

(A) MATTAPONI RIVER, VA.

The river was snagged from Walkerton to Dunkirk between April 26 and May 10, 1916. The U. S. snag boat *York*, with hired labor, performed the work, which consisted in removing 20 snags, 2 drift logs, and 3 overhanging trees from the river and securing them ashore.

The total expenditure during the fiscal year, \$1,486.97, was applied to maintenance of the improvement, and is distributed as follows: Plotting the survey made in the prior fiscal year, \$98.35; maintenance of U. S. tug *Castle*, \$413.63; snagging the river, \$687.44; repairs to snag boat *York*, \$57.85; and engineering, clerical, maintenance of office, care of property, and miscellaneous expenses, \$234.70.

APPROPRIATIONS.

June 14, 1880	\$2,500.00
Mar. 3, 1881	3,300.00
July 5, 1884	2,500.00
Aug. 5, 1886	5,000.00
Aug. 11, 1888	3,000.00
Sept. 19, 1890	3,000.00
July 13, 1892	4,000.00
Aug. 18, 1894	4,000.00
June 3, 1896	2,500.00
June 6, 1900 (allotted June 30, 1903)	800.00
Mar. 3, 1905 (allotted July 20, 1905)	5,500.00
Mar. 2, 1907 (allotted Apr. 1, 1907)	9,700.00
Mar. 3, 1906 (emergency allotment, Aug. 17, 1908, net)	5,981.31
Mar. 3, 1909 (allotted Mar. 23, 1909)	9,300.00
Mar. 3, 1909 (emergency allotment, Feb. 19, 1910)	3,000.00
June 25, 1910 (allotted July 13, 1910)	17,000.00
Feb. 27, 1911 (allotted Apr. 7, 1911)	5,000.00
July 25, 1912	10,000.00
Mar. 4, 1913 (allotted Apr. 11, 1913)	6,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	3,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)	4,000.00
July 27, 1916 (allotted)	4,000.00
Total appropriations	113,081.31
Received from sale of condemned property	\$30.50
Received from sale of steamer <i>General Warren</i> , 1912	500.00
Total from other sources for present project	530.50
Grand total of receipts from all sources	113,611.81

¹ Includes \$1,000 transferred from Carters Creek and \$2,200 from Occoquan Creek.

² Includes \$1,000 transferred from York River and \$800 from Pamunkey River.

COMMERCIAL STATISTICS.

ABOVE WALKERTON.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	206	20,566	295
Sailing.....	37	4,560	.....
Barges.....	26	7,240	.....
Unregistered scows and lighters.....	680	13,200	.....
Total.....	949	54,566	295

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Farm produce.....	1,160 tons.....	1,160	\$68,300
Fertilizer.....	750 tons.....	750	13,500
General merchandise.....	1,050 tons.....	1,050	128,000
Hay and feed.....	600 tons.....	600	12,100
Lime, agricultural.....	1,000 tons.....	1,000	3,750
Lumber.....	7,680,000 feet b. m.....	15,380	99,970
Pulpwood.....	2,170 cords.....	4,340	11,935
Railroad ties.....	30,000.....	3,000	16,500
Total.....	.....	27,280	350,055

BELOW WALKERTON.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	311	39,640	2,385
Sailing.....	142	16,260	.....
Barges.....	31	12,100	.....
Total.....	484	68,000	2,385

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Canned goods.....	35,000 cases.....	1,050	\$55,000
Farm produce.....	1,450 tons.....	1,450	116,785
Fertilizer.....	900 tons.....	900	14,400
General merchandise.....	840 tons.....	840	150,595
Hay and feed.....	950 tons.....	950	19,950
Lime, agricultural.....	560 tons.....	560	2,100
Live stock.....	625 head.....	27	6,300
Lumber.....	3,200,000 feet b. m.....	6,400	41,600
Pickles.....	2,000 barrels.....	500	20,000
Pulp wood.....	6,390 cords.....	12,780	35,145
Total.....		25,457	460,975

CONSOLIDATED.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	517	69,206	2,680
Sailing.....	179	20,520	
Barges.....	57	19,340	
Unregistered scows and lighters.....	680	13,200	
Total.....	1,433	122,566	2,680

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Canned goods.....	35,000 cases.....	1,050	\$55,000
Farm produce.....	2,610 tons.....	2,610	182,065
Fertilizer.....	1,650 tons.....	1,650	27,900
General merchandise.....	1,890 tons.....	1,890	276,695
Hay and feed.....	1,550 tons.....	1,550	32,050
Lime, agricultural.....	1,560 tons.....	1,560	5,850
Live stock.....	525 head.....	27	6,300
Lumber.....	10,890,000 feet, b. m.....	21,780	141,570
Pickles.....	2,000 barrels.....	500	20,000
Pulpwood.....	8,560 cords.....	17,120	47,080
Railroad ties.....	30,000.....	3,000	16,500
Total.....		52,737	811,080

(B) PAMUNKEY RIVER, VA.

The U. S. snag boat *York* left Washington in tow of the U. S. tug *Castle*, on February 3, but due to stress of weather did not reach the Pamunkey River until February 19. The river was examined and actual snagging operations were begun on February 23, and completed on March 16. The work extended to Newcastle Ferry, 52.5 miles above West Point, Va., and consisted in removing 20 snags and 93 overhanging trees and securing them ashore.

The total expenditure during the fiscal year, \$1,600.60, was applied to maintenance of improvement and is distributed as follows: Snag-

ging, \$729.26; maintenance of U. S. tug *Castle*, \$669.50; and engineering, clerical, maintenance office, care of property, and miscellaneous expenses, \$201.84.

APPROPRIATIONS.

June 14, 1880	\$2, 500. 00
Mar. 3, 1881	2, 500. 00
Aug. 2, 1882	2, 500. 00
Aug. 5, 1883	5, 000. 00
Aug. 11, 1888	3, 000. 00
Sept. 19, 1890	3, 000. 00
July 13, 1892	3, 000. 00
Aug. 18, 1894	2, 000. 00
June 3, 1896	2, 000. 00
June 6, 1900 (allotted Apr. 28, 1903)	1, 000. 00
Mar. 3, 1905 (allotted July 28, 1905)	3, 400. 00
Mar. 2, 1907 (allotted Apr. 1, 1907)	5, 500. 00
Mar. 3, 1909 (allotted Mar. 23, 1909)	8, 700. 00
June 25, 1910 (allotted July 13, 1910)	11, 220. 37
Feb. 27, 1911 (allotted Apr. 7, 1911)	5, 000. 00
Mar. 4, 1913 (allotted Apr. 11, 1913)	3, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)	1, 000. 00
Mar. 4, 1915 (allotted Apr. 2, 1915)	1, 000. 00
July 27, 1916 (allotted)	2, 000. 00
Total of appropriations	65, 820. 37
Total from other sources for present project (received from sale of steamer <i>General Warren</i>)	500. 00
Grand total of receipts from all sources	65, 820. 37

COMMERCIAL STATISTICS.

ABOVE WHITE HOUSE.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers	65	715
Sailing	58	7, 800
Barges	31	14, 400
Total	154	22, 915

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Fertilizer	150 tons	150	\$3, 700
Lime	370 tons	370	1, 757
Lumber	5, 973, 000 feet b. m.	11, 992	70, 580
Melons	120 tons	120	2, 300
Pulp wood	6, 510 cords	13, 020	20, 285
Railroad ties	24, 100	2, 410	12, 580
Total		28, 062	118, 892

¹ Original allotment was \$7,500, of which \$800 was transferred to Mattaponi River, Va.

² Includes \$1,220.37 transferred from York River.

BELOW WHITE HOUSE.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	54	594
Sailing.....	30	4, 200
Barges.....	21	6, 420
Total.....	105	11, 214

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Lime.....	430 tons.....	430	\$1, 843
Lumber.....	5, 974, 600 feet b. m.....	11, 902	70, 793
Pulp wood.....	2, 790 cords.....	5, 580	12, 555
Railroad ties.....	10, 300.....	1, 080	8, 260
Total.....		18, 942	93, 451

CONSOLIDATED.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	119	1, 309
Sailing.....	88	12, 000
Barges.....	52	20, 820
Total.....	259	34, 129

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Fertilizer.....	150 tons.....	150	\$2, 700
Lime.....	800 tons.....	800	3, 600
Lumber.....	11, 947, 600 feet b. m.....	23, 894	141, 353
Melons.....	120 tons.....	120	2, 300
Pulpwood.....	9, 300 cords.....	18, 600	41, 850
Railroad ties.....	34, 400.....	3, 440	20, 640
Total.....		47, 004	212, 343

(C) OCCOQUAN CREEK, VA.

No work was done at this locality during the fiscal year. The expenditure, \$129.20, was for office expenses and was applied to maintenance of the improvement. It is contemplated doing dredging in the near future where shoaling has taken place.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., pp. 511-512)-----	\$25,000.00
Existing project:	
Sept. 19, 1890-----	\$10,000.00
July 13, 1892-----	5,000.00
Aug. 18, 1894-----	5,000.00
June 3, 1896-----	2,500.00
Mar. 3, 1899-----	2,500.00
June 13, 1902 (allotments Sept. 5, 1902)-----	2,600.00
Mar. 3, 1905 (allotted July 28, 1905)-----	5,971.44
Mar. 2, 1907 (allotted Apr. 1, 1907)-----	¹ 17,800.00
Mar. 3, 1909 (allotted Mar. 23, 1909)-----	1,000.00
June 25, 1910 (allotted July 18, 1910)-----	18,000.00
Mar. 4, 1913 (allotted Apr. 11, 1913)-----	² 5,900.00
July 27, 1916 (allotted)-----	5,000.00
	<hr/>
	81,271.44
Total of appropriations-----	106,271.44
Deduct on account of transfer to other works (consolidated under act of June 13, 1902)-----	272.03
	<hr/>
Net total of appropriations-----	105,999.41

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	150	4,650	7
Sailing.....	57	1,196	
Barges.....	3	1,200	
Unregistered:			
Scows.....	310		
Rafts.....	25		
Total.....	545	7,046	7

¹Original allotment was \$20,000, of which \$2,200 was transferred to Mattaponi River, Va.

²Original allotment was \$6,000, of which \$100 was transferred to Aquia Creek, Va.

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Brick.....	4,000,000.....	15,000	\$28,000	33	(1)
Canned goods.....	5,000 cases.....	125	12,500	33	(1)
Cement and lime.....	3,500 barrels.....	600	3,300	33	(1)
Coal.....	6,060 tons.....	679	20,820	33	(1)
Cordwood.....	251 cords.....	439	816	33	\$0.0240
Flour and feed.....	163 tons.....	163	7,095	33	(1)
General merchandise.....	1,072 tons.....	1,072	123,123	33	(1)
Lumber.....	894,500 feet b. m.....	1,409	11,930	33	-----
Manure.....	6,000 tons.....	6,000	6,000	33	(1)
Miscellaneous.....	29 tons.....	29	2,178	33	(1)
Other building materials.....	23 tons.....	23	1,095	33	(1)
Piles.....	5,000.....	3,000	15,000	33	-----
Railroad ties.....	25,000.....	2,000	12,500	33	.0454
Stone.....	20,000 cubic yards.....	27,000	15,000	33	(1)
Total.....		57,739	259,351		

¹ Carried by District of Columbia sewers.

(D) AQUIA CREEK, VA.

No work was done and no expenditure made at this locality during the fiscal year. There were no funds available.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 898).....		\$31,528.20
Present project:.....		
July 25, 1912.....	\$21,400.00	
Mar. 4, 1913 (allotted Apr. 1, 1915, by transfer from Occoquan Creek, Va.).....	100.00	
July 27, 1916 (allotted).....	4,000.00	
		25,500.00
Total of appropriations.....		57,028.20
Deduct on account of transfer to other works (consolidated under act of June 13, 1902), (previous projects).....		463.86
Net total of appropriations.....		56,564.34

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	28	420
Sailing.....	49	1,920
Barges.....	6	2,376
Total.....	83	4,716

¹ Includes \$28.20, balance of allotment of \$100 from act of June 13, 1902, \$71.80 having been transferred to Carters Creek.

Freight traffic, 1915.

Articles	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	
Cordwood.....	840 cords.....	1,344	\$2,720	46	\$0.169
Fertilizer.....	90 tons.....	90	1,440	40	.025
General merchandise.....	180 tons.....	180	20,000	40	
Lumber.....	2,700,000 feet b. m.....	5,400	25,100	46	.0152
Other building materials.....	30 tons.....	30	900	40	
Pulpwood.....	700 cords.....	1,400	3,850		
Railroad ties.....	30,000.....	3,000	15,000		
Total.....		11,424	79,020		

8. RAPPAHANNOCK RIVER, VA.

The protection of sand fills was continued throughout the year with the exception of the winter months. A small force of men was employed. The work consisted in building 5,888 linear feet of wattling, repairing 1,670 linear feet of wattling, in planting 1,577 willow slips, in digging and cleaning out 4,363 linear feet of ditches, in laying 1,097 linear feet of terra-cotta tiling, and in making numerous minor repairs to the dikes and box drains. A survey of Fredericksburg Bar was made and plotted in June.

The freshets of the fiscal year, and their heights at Fredericksburg, were as follows:

	Feet.		Feet.
Aug. 5, 1915.....	12.7	Oct. 2, 1915.....	9.5
Aug. 29, 1915.....	5.8	Mar. 29, 1916.....	7.0
Aug. 31, 1915.....	6.2	June 18, 1916.....	16.3

The total expenditure during the fiscal year, \$4,356.72, was applied to maintenance of the improvement, and is distributed as follows: Plotting of survey made in the prior fiscal year, \$598.17; survey made in June, 1916, \$123.35; protection of sand fills, \$2,169.39; maintenance of U. S. tug *Castle*, \$763.07; and engineering, clerical, maintenance of office, care of property, and miscellaneous expenses, \$702.74.

APPROPRIATIONS..

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 584) - \$322, 416. 97

Existing project:

Mar. 3, 1905.....	\$40,000.00
Mar. 2, 1907.....	77,729.00
May 27, 1908.....	58,000.00
Mar. 3, 1909 (allotted Mar. 23, 1909).....	15,000.00
Mar. 4, 1909.....	32,000.00
June 25, 1910.....	15,000.00
July 25, 1912.....	5,000.00
Mar. 4, 1913.....	25,000.00
Oct. 2, 1914.....	5,000.00

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Existing project—Continued.

Mar. 4, 1915 (allotted Apr. 2, 1915)-----	\$8,000.00	
July 27, 1916-----	30,000.00	
		\$310,729.00
Total-----		683,145.97
Damages recovered from contractors' sureties-----	1,000.00	
Amount received from sales of condemned property-----	735.00	
Amount received from sale of <i>General Warren</i> -----	500.00	
Amount received for use of plant-----	30.00	
Total from other sources for present project-----		2,265.00
Grand total of receipts from all sources-----		635,410.97

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Total number of arrivals of vessels.

Classes.	Ameri- can.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers.....	1,975	486,394	40,887
Sailing.....	810	45,068	
Barges.....	138	52,215	
Total.....	2,923	583,677	40,887

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Brick.....	645,000.....	1,818	\$5,655		
Canned goods.....	86,700 cases.....	2,869	137,870	200	\$0.0075
Cement and lime.....	4,888 barrels.....	672	6,608		
Coal.....	6,518 tons.....	7,300	27,115		
Cordwood.....	4,940 cords.....	7,965	15,545		
Corn.....	132,600 bushels.....	3,696	103,330	200	.0060
Crabs.....	3,470 barrels.....	208	8,020		
Farm produce.....	17,890 tons.....	17,890	809,770	208	
Fertilizer.....	6,663 tons.....	6,663	120,876	208	.0061
Fish:					
Salt and fresh.....	11,896 packages.....	1,267	59,780		
For oil, etc.....	5,750 tons.....	5,750	27,800		
Oil.....	1,260 barrels.....	215	21,648		
Scrap.....	954 tons.....	954	33,360		
General merchandise.....	30,033 tons.....	30,033	3,702,560	206	
Grain.....	86,815 bushels.....	2,589	94,947		
Hay and feed.....	5,170 tons.....	5,170	110,180		
Ice.....	2,400 tons.....	2,400	13,960		
Lime, agricultural.....	2,880 tons.....	2,880	14,570		
Live stock.....	1,708 tons.....	1,708	218,990		
Lumber.....	7,307,558 feet, b. m.....	14,614	93,358		
Manufactured iron and steel.....	65 tons.....	65	5,800		
Mine props.....	2,089 tons.....	2,089	20,890		
Miscellaneous.....	168 tons.....	168	31,250		
Oil and gasoline.....	412,238 gallons.....	1,360	55,682		
Other building material.....	650 tons.....	650	19,075		
Oysters.....	229,865 bushels.....	12,696	132,700		
Oysters, shucked.....	172,931 gallons.....	835	138,345		
Oyster shells.....	30,000 bushels.....	900	1,050		
Packing cases.....	74,900.....	375	26,460		
Pulpwood.....	32,375 cords.....	61,512	161,875		
Railroad ties.....	358,758.....	35,875	179,320		
Total.....		233,161	6,458,344		

9. URBANA CREEK, VA.

The repairs to the Urbana dikes were made July 21 and 24. A small force of men, hired labor, did the work. The stone dike on the left side of the channel was repaired by replacing stone that had been knocked over by the ice and by moving other stone from such portions of the dike as were protected by trees and vegetation. All of the low places were restored in this way to their original height of 4 feet above mean low water. The timber dike on the right side of the channel for the 537 linear feet from its inner end was raised 16 inches. This increased height was obtained by drift-bolting 6 by 12 inch and 4 by 4 inch timbers placed edgewise to the top of the dike. The outer 180 feet of the timber dike has no fill behind it, and as an increased height was unnecessary no work was done. The materials used in raising the timber dike were 32 lengths of 6 by 12 inch by 16 foot Georgia pine, 32 lengths of 4 by 4 inch by 16 foot Georgia pine, about one hundred and twenty 20-inch drift-bolts, and about 50 pounds of 5-inch spikes.

The dike is now in good condition, and no work during the ensuing fiscal year 1917 is contemplated.

The total expenditure during the fiscal year, \$500, was applied to maintenance of the improvement, and is distributed as follows: Repairs to dike, \$333.68; maintenance of U. S. tug *Castle*, \$64; and engineering, clerical and maintenance of office, \$102.32.

APPROPRIATIONS.

Mar. 3, 1879	\$5, 000
June 14, 1880	2, 500
Mar. 3, 1881	4, 000
Aug. 2, 1882	4, 000
Aug. 11, 1888	3, 000
Sept. 19, 1890	3, 000
July 13, 1892	3, 000
Aug. 18, 1894	3, 000
June 3, 1896	3, 000
Mar. 3, 1899	3, 000
Mar. 3, 1905	10, 000
Mar. 3, 1909 (allotted Mar. 23, 1909)	4, 000
June 25, 1910	8, 500
Feb. 27, 1911	10, 000
Mar. 4, 1913 (allotted June 22, 1915)	500
Total	68, 500

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Total number of arrivals of vessels.

Classes.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered:			
Steamers	484	217, 576	2, 647
Sailing	159	7, 378	.....
Total	643	224, 954	2, 647

¹ Allotted from appropriation of \$15,000 for Rappahannock River.

Freight traffic, 1915.

Articles.	Amount in customary units	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Brick.....	202,000.....	600.....	\$2,020.....		
Canned goods.....	12,000 cases.....	420.....	18,000.....	160.....	\$0.0087
Cement and lime.....	570 barrels.....	114.....	1,110.....		
Coal.....	927 tons.....	1,038.....	6,320.....		
Cordwood.....	615 cords.....	1,045.....	1,845.....		
Farm produce.....	780 tons.....	780.....	40,800.....	104.....	
Fertilizer.....	486 tons.....	486.....	9,690.....	104.....	.0120
Fish and crabs.....	460 barrels.....	51.....	8,000.....	188.....	
General merchandise.....	1,250 tons.....	1,250.....	133,800.....		
Hay and feed.....	560 tons.....	560.....	14,160.....		
Ice.....	1,500 tons.....	1,500.....	6,750.....		
Lime, agricultural.....	420 tons.....	420.....	2,520.....		
Live stock.....	1,850 head.....	110.....	11,900.....	104.....	
Lumber.....	1,600,000 feet b. m.....	3,200.....	20,800.....		
Manufactured iron and steel.....	55 tons.....	55.....	5,800.....		
Oils and gasoline.....	31,200 gallons.....	102.....	4,054.....		
Other building materials.....	90 tons.....	90.....	2,400.....		
Oysters.....	2,166 tons.....	2,166.....	48,000.....		
Oyster shells.....	30,000 bushels.....	900.....	1,050.....		
Pulpwood.....	490 cords.....	980.....	2,640.....		
Railroad ties.....	6,500.....	650.....	3,200.....		
Total.....		16,627.....	339,861.....		

10. HARBOR AT MILFORD HAVEN, VA.

The work of repairing the riprap dike at the northwest entrance to the harbor at Milford Haven, Va., was done between July 26 and 31. The work was done by a small force, hired labor, and consisted in replacing in its proper position the stone which had been knocked over by ice and securing it with cement mortar.

Stone was also removed from portions of the dike which had the protection of vegetation and was placed in low places where settlement had occurred or where there was not sufficient stone to raise the dike to its proper elevation. The dike now is fully restored to its projected elevation of 4 feet above mean low water. Fifteen barrels of cement were used in making mortar for holding the top courses of the dike.

The dike is now in good condition, and no work during the ensuing fiscal year 1917 is contemplated.

The total expenditure during the fiscal year, \$300, was applied to maintenance of the improvement, and is distributed as follows: Repairs to dike, \$182.20; maintenance of U. S. tug *Castile*, \$24; and engineering, clerical and maintenance of office, \$93.80.

APPROPRIATIONS.

Mar. 8, 1899.....	\$12,500.00
June 13, 1902.....	5,000.00
June 25, 1910.....	3,000.00
Feb. 27, 1911.....	2,500.00
July 25, 1912.....	5,000.00
Mar. 4, 1913 (allotted June 22, 1915).....	300.00
Total of appropriations.....	28,300.00
Carried to surplus fund on June 30, 1909.....	57.81
Net total.....	28,242.19
Total from other sources for project (judgment recovered).....	3,032.97
Grand total of receipts from all sources.....	31,275.16

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Total number of arrivals of vessels.

Class.	American.	Net registered tonnage.	Passenger arrivals and departures.
Registered steamers.....	164	65,344	1,466

Impossible to secure data on arrivals of sailing vessels and barges.

Freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Coal.....	200 tons.....	200	\$1,090	135	
Farm produce.....	453 tons.....	453	30,600	135	
Fertiliser.....	360 tons.....	360	6,480	135	\$0.0111
Fish and crabs.....	1,050 tons.....	1,050	73,000	135	
Gasoline and oils.....	260 tons.....	260	9,800		
General merchandise.....	1,860 tons.....	1,860	252,800	135	
Hay, feed, etc.....	330 tons.....	330	8,360	135	
Ice.....	240 tons.....	240	1,680	30	.0550
Lumber and other building materials.....	500 tons.....	500	6,000		
Oysters.....	65,000 bushels.....	2,600	32,000	135	
Total.....		7,983	402,210		

IMPROVEMENT OF RIVERS AND HARBORS IN THE NORFOLK, VA., DISTRICT.

REPORT OF CAPT. G. B. HUMPHREY, CORPS OF ENGINEERS.

IMPROVEMENTS.

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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 498 TO 534.

1. HARBOR AT NORFOLK, CHANNELS TO NEWPORT NEWS, AND THIMBLE SHOAL CHANNELS, VA.

(A) NORFOLK HARBOR.

No work, either of improvement or maintenance, was done during the year. The expenditures from the funds allotted, amounting to \$4,720.64, were for inspections, care, and maintenance of floating plant and office expenses.

APPROPRIATIONS.

Previous projects: Amount appropriated for Norfolk Harbor and Elizabeth River, Va. (see H. Doc. No. 1491, 63d Cong., 3d sess., pp. 508-509).....		\$2, 471, 282. 00
Present project:		
June 25, 1910 (allotted Aug. 12, 1910).....	\$295, 000. 00	
Feb. 27, 1911 (allotted Mar. 10, 1911).....	240, 000. 00	
July 25, 1912 (allotted July 29, 1912).....	4, 000. 00	
Aug. 24, 1912 (allotted Sept. 23, 1912).....	165, 000. 00	
Mar. 4, 1913 (allotted Apr. 8, 1913).....	45, 500. 00	
June 23, 1913 (allotted July 17, 1913).....	197, 500. 00	
		947, 000. 00
Total.....		3, 418, 282. 00
Amount turned into surplus fund of the Treasury from appropriation of July 7, 1893.....	483. 58	
Transferred under river and harbor act of Mar. 4, 1915.....	134, 000. 00	
		134, 483. 58
Net total.....		3, 283, 798. 42
Received from sales.....		772. 89
Grand total.....		3, 284, 571. 31
		2161

SOUTHERN BRANCH OF ELIZABETH RIVER.

Present project:

June 25, 1910 (allotted Aug. 12, 1910)-----	\$100,000.00
Feb. 27, 1911 (allotted Mar. 10, 1911)-----	85,000.00
Aug. 24, 1912 (allotted Aug. 24, 1912)-----	50,000.00
Mar. 4, 1913 (allotted Apr. 8, 1913)-----	5,000.00

Total----- \$190,000.00

WESTERN BRANCH OF ELIZABETH RIVER.

Previous projects (see H. Doc. No. 1491, 63d Cong.,

8d sess., p. 447)----- \$55,000.00

Present project: Mar. 4, 1913----- 87,000.00

Total----- 142,000.00

Amount turned into surplus fund of

Treasury from act of June 8, 1896----- \$323.85

Transferred under river and harbor act

of Mar. 4, 1915----- 30,000.00

80,323.85

Net total----- 111,671.65

Grand total----- 3,586,242.96

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Class.	American.	Foreign.	Total.	Aggregate net registered tonnage.	Passengers.
Registered:					
Steamers.....	14,088	16,348	110,386	21,851,904	872,042
Sailing.....	1234	1274	1508	1,025,764	None.
Total.....	4,272	6,622	10,894	22,787,758	872,042

¹ Only entries and clearances through the customhouse at Norfolk, Va.

² In addition to the above the steam ferries operating between Norfolk, Portsmouth, and Berkley, Va., carried 8,293,030 passengers and 558,890 vehicles during the calendar year 1915.

NOTE.—Unregistered not known.

During the year 14 steamers left this harbor drawing 30 feet of water or over and 16 steamers drawing 29 feet or over.

TABLE NO. 1.—Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	
Asphalt.....	1,993 tons.....	1,993	\$12,916	.....	.....
Bags.....	9,600 bags.....	48	10,560	.....	.....
Beans.....	29,599 sacks.....	1,479	259,800	.....	.....
Boots and shoes.....	56,619 tons.....	56,619	109,857,000	.....	.....
Brick.....	6,000,000 brick.....	18,000	48,000	35	.....
Building material.....	20,916 tons.....	20,916	1,045,800	.....	.....
Canned goods.....	32,421 tons.....	32,421	6,484,200	.....	.....
Cement.....	6,365 barrels.....	1,273	12,730	.....	.....
Coal.....	10,947,979 tons.....	10,947,979	23,843,637	.....	.....

TABLE No. 1.—*Freight traffic*—Continued.

Articles	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Coke	38,708 tons	38,708	\$154,832		
Copper	12,433 tons	12,433	372,980		
Cotton	680,361 bales	170,090	34,018,000		
Cotton products	26,965 tons	26,965	10,786,000		
Cotton-seed meal	15,108 tons	15,108	604,120		
Crushed stone	42,004 tons	42,004	94,509	400	\$0.00675
Dried fruit	4,734 boxes	39	17,732		
Dry goods	268,101 tons	268,101	119,240,400		
Fertilizer	313,153 tons	313,153	12,526,120		
Fertilizer material	163,981 tons	163,981	9,199,062		
Flour	21,541 tons	21,541	1,310,460		
Fruit and vegetables	147,536 tons	147,536	6,901,440		
Fish, oysters, and clams	3,468 tons	3,468	416,160		
Grain	1,222,960 bushels	35,574	1,222,960		
Gasoline	24,492,406 gallons	73,477	4,898,481		
Gypsum rock	13,205 tons	13,205	79,230		
Hay	7,597 tons	7,597	151,940		
Hides	8,851 tons	8,851	3,540,400		
Horses	9,524 horses	4,762	1,428,600		
Iron, pig	332,798 tons	332,798	6,655,960		
Iron, scrap	3,540 tons	3,540	21,240		
Jute	1,400 tons	1,400	60,000		
Logs, mill	10,944,297 feet	218,885	13,680		
Lath	2,334,100 laths	583	5,835		
Lead	280 tons	280	44,800		
Lime, agriculture	600 tons	600	4,200		
Lime, building	478 tons	478	4,780		
Lumber	1,891,506,843 feet b. m.	2,847,760	56,965,205		
Ochre	232 tons	232	46,400		
Oil, cottonseed	207,462 gallons	721	155,596		
Oil, refined	2,379,333 gallons	7,138	475,866		
Oil, miscellaneous	74,011,333 gallons	222,034	7,401,133		
Ores	72,656 tons	72,656	1,816,400		
Paper	23,588 tons	23,588	2,830,560		
Peanuts	11,090 tons	11,090	1,330,800		
Phosphate rock	15,714 tons	15,714	94,284		
Piling	134,963 feet	2,749	13,496		
Plaster rock	11,832 tons	11,832	70,992		
Potatoes	1,279,253 barrels	9,543	1,279,253		
Sand and gravel	119,079 tons	119,079	267,927		
Shells, oyster	27,705 tons	27,705	55,410		
Soda nitrate	129,113 tons	129,113	7,746,780		
Staves	660,000 staves	330	6,600		
Steel, manufactured	49,994 tons	49,994	9,998,800		
Sugar	10,884 tons	10,884	1,306,080		
Tanning extract	2,490 tons	2,490	249,000		
Tobacco	38,740 tons	38,740	7,748,000		
Ties, railroad	5,328 ties	1,065	2,664		
Tile, pipe	1,250 tons	1,250	10,000		
Wheat	7,800 bushels	234	7,800		
Wood, fire	429 cords	643	1,287		
Wood, paving blocks	187,877 blocks	13,733	294,997	350	.004
Wood, pulp	179 cords	240	4,800		
Wool	21,941 tons	21,941	8,776,400		
Miscellaneous ¹	5,033,468 tons	5,033,468	1,510,040,400		
Total		21,712,166	2,042,335,814		

¹ Includes agricultural products, machinery, dry goods, groceries, agricultural implements, and other manufactured articles, the quantities and values of each of which it has been impossible to ascertain.

The usual limit of draft for loaded boats carrying principal classes of traffic for year 1916 is not available

A considerable portion of the freight traffic noted in the table above consisted of coal taken in bunkers by ships entering Norfolk Harbor for the purpose of filling the bunkers only and that did not leave or load freight at this port. Consequently the port, in the above table, gets no credit for any of the freight carried by these vessels except for the coal loaded in the bunkers, although freight carried by these vessels passed twice over the channels of this port, once coming in and once going out. Data as to the cargo carried by

these ships for the calendar year 1915 have been obtained from the customhouse, Norfolk, Va., as follows:

Weights and values of cargoes carried in transit in 1,415 vessels, having an aggregate net tonnage of 3,247,941 tons, which called for bunker coal during the calendar year 1915.

TABLE No. 2.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Barley	1,181,700 bushels	35,451	\$1,181,700
Canned goods	4,971 tons	4,971	994,200
Copper	9,583 tons	9,583	287,490
Cotton	405,741 tons	405,741	81,148,200
Cottonseed meal and cake	240,228 tons	240,228	9,609,120
Fertilizer	23,994 tons	23,994	959,760
Flour	62,080 tons	62,080	4,345,600
Fruit, dried	1,089 tons	1,089	435,600
Grain	697,621 tons	697,621	23,021,493
Jute	8,564 tons	8,564	428,200
Logs	938,630 feet	18,772	116,390
Lumber	69,511,378 feet	104,267	2,085,341
Naval stores	29,415 tons	29,415	588,300
Oil, cottonseed	21,172 gallons	74,102	21,172
Oil, fuel	121,811,500 gallons	485,246	12,181,150
Oil, miscellaneous	47,072,000 gallons	154,147	9,414,400
Ores	31,641 tons	31,641	791,025
Phosphate rock	76,697 tons	76,697	460,182
Petroleum products	19,908 tons	19,908	1,990,800
Pig iron	31,299 tons	31,299	625,980
Pig lead	2,252 tons	2,252	360,320
Scrap iron	9,082 tons	9,082	54,462
Soda, nitrate	101,193 tons	101,193	6,071,580
Staves	7,072,798 staves	3,536	141,455
Steel	53,159 tons	53,159	1,063,180
Sugar	80,828 tons	80,828	11,315,920
Sulphur	8,464 tons	8,464	1,692,800
Ties, railroad	26,825	5,365	13,412
Tobacco	9,829 tons	9,829	1,965,800
Wheat	36,281,800 bushels	1,088,454	36,281,800
Miscellaneous	194,706 tons	194,706	38,941,800
Total		4,071,687	248,588,662

In addition to the above, there were 91 vessels, having an aggregate tonnage of 245,118 tons, the character, weights, and values of whose cargoes could not be ascertained, but, basing the weights and values of cargoes on the figures given in the above table, it would give an additional cargo of about 261,807 tons, valued at about \$15,608,420, making a total of about 4,333,494 tons, valued at about \$264,197,082, which amounts added to the totals of freight-traffic table No. 1, would make a grand total of about 26,045,660 tons, valued at about \$2,806,532,896.

The marked decrease in the number of vessels carrying freight in transit and the increase in the valuation from, the last report, is due to so many vessels in the coal trade arriving with water or dirt ballast only and the general advance in price of most all commodities.

During the year 1915 there came to Norfolk Harbor, carrying dirt or water ballast, 1,243 vessels having an aggregate net tonnage of 2,953,333 tons.

(B) CHANNELS TO NEWPORT NEWS.

No work was done for improvement or maintenance during the fiscal year. Examinations of the channel were made in July and November, 1915. The funds expended, amounting to \$385.25, were in connection with this examination and for office expenses.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 509) --- \$237, 500
 Present project:

June 25, 1910 (allotted Aug. 12, 1910)-----	\$115, 000
Feb. 27, 1911 (allotted Mar. 1, 1911)-----	150, 000
Aug. 24, 1912 (allotted Sept. 23, 1912)-----	210, 000
Mar. 4, 1913 (allotted Apr. 8, 1913)-----	15, 000
	<hr/> 490, 000

Total of appropriations ----- 727, 500

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Class.	American.	Foreign.	Total.	Aggregate net regis- tered tonnage.	Passen- gers.
Registered:					
Steamers.....	116	1, 684	1, 750	7, 617, 262	299, 800
Sailing.....	92	14	106	112, 656	None.
Total.....	208	2, 648	2, 856	7, 729, 920	299, 800

¹ Only entrances and clearances through customhouse at Newport News, Va.

NOTE.—Unregistered not known.

During the year 8 steamers left this harbor drawing 30 feet of water or over and 16 steamers drawing 20 feet or over.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Barley.....	113, 436 bushels.....	3, 403	\$112, 436
Boots and shoes.....	33, 689 tons.....	33, 689	101, 067, 000
Building material.....	36, 028 tons.....	36, 028	1, 601, 400
Canned goods.....	21, 873 tons.....	21, 873	4, 374, 600
Clay, china.....	55, 867 tons.....	55, 867	449, 936
Coal.....	4, 410, 859 tons.....	4, 410, 859	13, 232, 577
Corn.....	3, 090, 640 bushels.....	77, 266	3, 090, 640
Copper.....	2, 485 tons.....	2, 485	74, 550
Cotton.....	162, 840 bales.....	40, 710	8, 142, 000
Dry goods.....	103, 979 tons.....	103, 979	41, 591, 600
Fertilizer.....	56, 519 tons.....	56, 519	2, 266, 760
Fruit and vegetables.....	14, 581 tons.....	14, 581	729, 050
Flour.....	59, 416 tons.....	58, 416	4, 504, 960
Grain.....	931, 520 bushels.....	23, 298	931, 520
Hay.....	16, 078 tons.....	16, 078	321, 560
Hay and grain.....	15, 393 tons.....	15, 393	461, 790
Hides and leather.....	3, 387 tons.....	3, 387	1, 354, 800
Horses.....	47, 359 horses.....	23, 680	7, 103, 860
Horses and mules.....	85, 649.....	42, 830	12, 847, 350
Lumber.....	77, 574, 415 feet.....	116, 361	2, 327, 231
Mules.....	8, 460 mules.....	4, 230	1, 692, 000
Ore.....	740 tons.....	740	18, 500
Oats.....	46, 626, 943 bushels.....	746, 081	22, 380, 930
Oil, refined.....	2, 740, 572 gallons.....	9, 592	548, 114
Oil, miscellaneous.....	1, 301, 653 gallons.....	4, 555	520, 661
Paper.....	9, 892 tons.....	9, 892	1, 187, 040
Pig iron.....	6, 783 tons.....	6, 783	135, 660
Pig lead.....	6, 725 tons.....	6, 725	1, 078, 000
Rye.....	462, 331 bushels.....	13, 871	231, 190
Steel, manufactured.....	89, 350 tons.....	89, 350	8, 935, 000
Sugar.....	5, 929 tons.....	5, 929	830, 060
Tobacco.....	12, 349 tons.....	12, 349	2, 469, 800
Wheat.....	12, 519, 040 bushels.....	375, 571	12, 519, 040
Wool.....	13, 641 tons.....	13, 641	5, 445, 600
Miscellaneous ¹	871, 981 tons.....	871, 981	174, 396, 200
Total.....		7, 327, 932	428, 965, 405

¹ Includes lard, oleomargarine, wire, salt, fish, seeds, coffee, rags, waste paper, toys, chemicals, crockery, enamel ware, matches, clocks, and other manufactured articles, the quantities and values of each of which it has been impossible to ascertain.

(C) THIMBLE SHOAL.

No work was done for improvement or maintenance during the year, and no expenditures made.

APPROPRIATIONS.

Present project:

June 25, 1910 (allotted Aug. 12, 1910)-----	\$235, 000
Mar. 4, 1913 (allotted Apr. 3, 1913)-----	125, 000
Total of appropriations-----	360, 000
Transferred under river and harbor act of Mar. 4, 1915-----	10, 000
Net total-----	350, 000

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

See current annual report of district engineer officer under "Harbor at Norfolk, channels to Newport News, and Thimble Shoal Channel, Va."—(a) Norfolk Harbor and (b) channels to Newport News.

The commerce passing through this channel is the foreign and outside coast-wise traffic to both Norfolk and Newport News, and consists of boots and shoes, coal, cotton, corn, canned goods, fertilizer, dry goods, live stock, forest and agricultural products, manufactured steel, wheat, and general merchandise. It is not practicable to separate it from the total traffic, which would also include traffic in Chesapeake Bay. During the calendar year 1915, 1,506 vessels carrying cargoes aggregating about 4,333,494 short tons, valued at \$264,197,062, passed through this channel for bunker coal. In addition, 1,248 vessels carrying ballast only, passed through this channel.

2. NANSEMOND RIVER, VA.

No work was done for improvement during the fiscal year. An examination of the channel was made in July, 1915. The expenditures, amounting to \$258.07, were in connection with this examination, inspections, office expenses, etc.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 502)----- \$37, 000

Present project:

Aug. 11, 1888-----	\$10, 000
Sept. 19, 1890-----	10, 000
July 13, 1892-----	10, 000
Aug. 18, 1894-----	10, 000
June 3, 1896-----	5, 000
Mar. 8, 1899-----	5, 000
Mar. 2, 1907-----	5, 000
June 25, 1910-----	5, 000
Feb. 27, 1911-----	3, 000
	63, 000
Total of appropriations-----	100, 000

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Class.	American.	Aggregate net reg- istered ton- nage.
Registered:		
Steamers ¹	2	(²)
Sailing.....	6	(²)
Barges.....	26	(²)
Unregistered:		
Sailing.....	10	(²)
Barges.....	8	(²)
Total.....	51	(²)

¹ One of these steamers made 53 round trips during the calendar year 1915.² Not known.

Passengers, none.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	
Brick.....	6,000,000.....	13,000	\$48,000	30	(¹)
Clay.....	12,400 tons.....	12,400	3,060	60	(¹)
Coal.....	5,544 tons.....	5,544	16,600	330	(¹)
Fertilizer.....	5,296 tons.....	5,296	211,800	200	(¹)
Hay.....	80 tons.....	80	1,600	30	(¹)
Lumber.....	7,554,964 feet b. m.....	11,332	226,648	800	\$6.006
Oysters.....	36,000 bushels.....	1,200	60,000	(¹)	(¹)
Shells, oyster.....	1,500 tons.....	1,600	3,600	200	.008
Total.....		50,351	570,738	(¹)	(¹)

¹ Not known.

The usual limit of draft for loaded vessels is 9½ feet.

3. JAMES RIVER, VA.

Operations during the fiscal year comprised dredging and rock excavation for enlarging about 4,000 linear feet of channel on Richmond Bar between jetty 26 and jetty 41, about 1½ and 2½ miles, respectively, below Richmond. All of the work was new and was done by contract. It was begun December 9, 1915, and completed, as far as the funds available permitted, June 10, 1916. Its total cost was \$49,204.86. The details comprised excavating 3,758.16 cubic yards of hard rock and 5,824.8 cubic yards of earth and disposing of these materials on revetting regulation works in Warwick, Kingsland, and Varina Reaches; also in removing and depositing ashore 988.55 cubic feet of logs, snags, piles, and stumps. The results of the work consisted in widening, for a depth of 18 feet at mean low water,

3,250 linear feet of channel to 200 feet and 750 linear feet to from 175 to 195 feet. The total cost per cubic yard of rock excavated and disposed of was \$11.90; of earth excavated and disposed of, \$0.73; and \$0.22 per cubic foot for removing and disposing of logs, snags, etc. The mapping of field notes of the survey of 1914 was completed and report on reexamination of the river with estimate of cost of completing the project and modifications of it submitted December 20, 1915. Prior to beginning contract work no record of freshets was made. From the beginning of contract work to the end of the fiscal year there were two freshets, as follows: One on December 31, 1915, cresting at 7 feet above mean low water and one on June 17, 1916, cresting at 10 feet above the same plane.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 470) _	\$763, 000. 00
Present project:	
July 5, 1884 _ _ _ _ _	\$75, 000. 00
Aug. 5, 1886 _ _ _ _ _	112, 500. 00
Aug. 11, 1888 _ _ _ _ _	225, 000. 00
Sept. 19, 1890 _ _ _ _ _	200, 000. 00
July 13, 1892 _ _ _ _ _	200, 000. 00
Aug. 18, 1894 _ _ _ _ _	100, 000. 00
June 3, 1896 _ _ _ _ _	120, 000. 00
Mar. 3, 1899 _ _ _ _ _	150, 000. 00
June 13, 1902 _ _ _ _ _	300, 000. 00
Mar. 3, 1905 _ _ _ _ _	200, 000. 00
Mar. 2, 1907 _ _ _ _ _	200, 000. 00
Mar. 3, 1909 (allotted Apr. 20, 1909) _ _ _ _ _	10, 000. 00
June 25, 1910 _ _ _ _ _	250, 000. 00
Feb. 27, 1911 _ _ _ _ _	150, 000. 00
July 25, 1912 _ _ _ _ _	70, 000. 00
Mar. 4, 1913 _ _ _ _ _	75, 000. 00
Mar. 4, 1915 _ _ _ _ _	50, 000. 00
July 27, 1916 _ _ _ _ _	190, 000. 00
	<hr/> 2, 877, 500. 00
Total of appropriations _ _ _ _ _	3, 440, 500. 00
Received from sale of condemned property _ _ _ _ _	364. 58
Other receipts _ _ _ _ _	1. 67
	<hr/> 3, 440, 866. 25
Aggregate _ _ _ _ _	

CONTRACT IN FORCE.

DREDGING AND ROCK EXCAVATION.

Contractor: Maryland Dredging & Contracting Co.

Date of contract: October 18, 1915.

Approved: October 30, 1915.

Date fixed for commencement: December 2, 1915.

Date fixed for completion: July 2, 1916.

Amount of contract and rate: For earth excavation, including its carriage to and deposit at specified localities between the points of excavation and the lower end of Varina Reach, 15,000 cubic yards, at 57 cents per cubic yard, displacement measurement; for hard rock excavation, including its carriage to and deposit at specified localities between the points of excavation and the lower end of Varina Reach, \$9.30 per cubic yard, displacement measurement; for removing and depositing on shore logs, snags, piles, and stumps, 17 cents per cubic foot.

Completed June 10, 1916.

COMMERCIAL STATISTICS.

ARRIVALS AND DEPARTURES OF VESSELS AT THE PORT OF RICHMOND, VA.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passenger.
Registered:			
Steamers.....	1,897	757,996	81,839
Sailing.....	104	10,962	
Barges.....	383	133,250	
Unregistered barges.....	4	600	
Total.....	2,388	902,808	81,839

Freight traffic, 1915.

PORT OF RICHMOND VA.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	532,800	1,200	\$10,000
Coal.....	30,242 tons	30,242	157,257
Cement.....	17,840 barrels	3,568	24,084
Canned goods.....	17,800 cases	627	26,775
Fertilizer.....	16,463 tons	16,463	196,035
Fertilizer material.....	10,802 tons	10,802	78,456
Fish.....	23,702 barrels	2,951	275,037
Fish roe.....	7,755 cases	194	19,400
Grain.....	99,662 bushels	2,992	106,179
Iron.....	710 tons	710	14,400
Lumber.....	180,000 feet b. m.	270	2,850
Merchandise.....	161,832 tons	161,832	45,280,850
Oil and gasoline.....	10,539,304 gallons	36,261	608,929
Oyster shells.....	10,750 bushels	851	1,720
Railroad ties.....	118,997	13,256	96,800
Roofing material.....	1,404 tons	1,404	14,040
Sand.....	670 tons	670	1,112
Staves.....	7,182	21	220
Wood.....	42,023 cords	83,219	234,641
Total.....		366,563	47,135,794

POINTS ON JAMES RIVER BELOW RICHMOND, VA.

Acid.....	500 tons	500	\$5,000
Brick.....	9,644,555	25,882	121,640
Building material.....	140 tons	140	7,000
Box shooks.....	1,925,000	10,239	192,500
Coal.....	4,180 tons	4,180	12,025
Cement.....	284 barrels	54	540
Fertilizer.....	1,066 tons	1,066	12,380
Fish.....	750 barrels	62	9,500
Flour.....	3,080 barrels	302	18,650
Grain.....	97,938 bushels	2,755	93,710
Hay and straw.....	1,720 tons	1,720	28,320
Iron.....	40 tons	40	2,500
Laths.....	1,933,000	3,866	11,598
Lumber.....	17,384,278 feet b. m.	26,212	963,667
Logs.....	100,000 feet	3,030	24,240
Live stock.....	2,276 head	738	78,180
Miscellaneous.....	13,327 tons	13,327	2,800,641
Mine props.....	4,655	524	4,192
Oil.....	1,050 barrels	146	4,600
Potatoes.....	4,000 bushels	120	3,970
Piling.....	10,000	6,075	30,600
Peanuts.....	32,336 bushels	380	15,700
Pulp wood.....	8,628 cords	14,473	45,727
Railroad ties.....	130,344	15,843	96,955
Wood.....	22,964 cords	28,211	119,242
Total.....		189,905	4,784,047

Returns of arrivals and departures of vessels for points on James River below Richmond, Va., are too incomplete for report.

4. PAGAN RIVER, VA.

No work of improvement or maintenance was done, and no expenditures made.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 8d sess., p. 520) - \$20,870.00

Present project:

June 25, 1910.....	\$4,600.00	
July 25, 1912.....	1,000.00	
Mar. 4, 1913.....	1,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915).....	2,000.00	
		8,600.00

Total of appropriations.....	29,470.00
Amount turned into surplus fund of the Treasury from the act of June 18, 1902.....	198.99
Net total.....	29,271.01

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Class.	American.	Aggregate net registered tonnage.	Passengers.
Registered steamers.....	14	700	57,315
Unregistered sailing and gasoline.....	6	(?)	Noma.
Total.....	10	(?)	57,315

¹ Two of these steamers made 616 round trips during the calendar year 1915.

² Not known.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.
Coal.....	500 tons.....	500	\$1,500	Miles. 28
Peanuts.....	14,000 tons.....	14,000	1,680,000	28
Miscellaneous ¹	34,094 tons.....	34,094	10,408,200	28
Total.....		49,194	12,089,700	28

¹ Includes agricultural implements, dry goods, groceries, and manufactured articles, the quantities of each of which it has been impossible to ascertain.

The usual limit of draft for loaded vessels is from 2 to 7 feet.

5. APPOMATTOX RIVER, VA.

Dredging for maintaining the navigable channel at Petersburg, Va., begun in March, 1915, was carried on until August 6, 1915, under

subproject approved by the Chief of Engineers United States Army, January 22, 1915. The work was done by hired labor with Government plant. The plant consisted of the U. S. hydraulic dredge *Hampton*, the launch *Powhatan*, one 200-ton scow, one 12-ton flatboat, 14 pontoons 20 feet long, and 480 feet of 12-inch discharge pipe. The work done consisted in restoring the project dimensions of the channel, viz, 80 feet bottom width by 12 feet deep at high water for a distance of 350 feet in the vicinity of Lieutenant Run, involving the excavation of 3,153 cubic yards of sand and mud deposited by freshets. This completed the work most urgently needed. In the early part of August the boiler of the dredge became unserviceable, and the plant was removed to the vicinity of Norfolk August 24, 1915, by the U. S. dredge tender *Skycoak*. The total cost of the work amounted to \$3,445.75, of which \$2,680.69, including cost of moving plant from Petersburg to Norfolk, was for dredging and \$765.06 for supervision and office expenses.

Provision is made for dredging shoals that may form in the navigable channel until July 1, 1917, under subproject approved by the Chief of Engineers United States Army May 19, 1915, with the balance of funds reallocated April 1, 1915, under act of March 4, 1915, from appropriation of June 25, 1910, and \$5,000 appropriated under act of June 25, 1910, available for maintenance of the general project. The available balance not being considered sufficient for the maintenance of the improvement until June 30, 1918, an estimate of additional funds is submitted. It is proposed to apply these funds to maintenance by dredging at such points as may be necessary.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong, 3d sess, p. 898).— \$461, 830. 00

Present project:

June 13, 1902	\$32, 500. 00	
Mar. 3, 1903	175, 000. 00	
June 6, 1900 (allotted Sept. 23, 1903)	5, 000. 00	
Apr. 28, 1904 (allotted Oct. 28, 1904)	12, 000. 00	
Mar. 3, 1905	10, 000. 00	
Mar. 2, 1907	50, 000. 00	
Mar. 2, 1907 (allotted Sept. 1, 1908)	10, 000. 00	
Mar. 3, 1909 (allotted Apr. 10, 1909)	5, 000. 00	
June 25, 1910	93, 000. 00	
		892, 500. 00
Total of appropriations		858, 830. 00
Repaid to appropriation for emergencies in river and harbor works	7, 181. 70	
Transferred under river and harbor act of Mar. 4, 1915	11, 000. 00	
		18, 181. 70
Net total		835, 698. 30

¹The discrepancy between the total of appropriations under previous project, as shown herein, and as stated in Annual Report for 1915, results from the omission in the latter of an appropriation of \$22,500 (act of Aug. 30, 1852), being a part of joint appropriation for James and Appomattox Rivers.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	271,111.....	610	\$5,082
Coal.....	410 tons.....	410	1,640
Cement.....	2,500 barrels.....	475	3,208
Fertilizer.....	6,497 tons.....	6,497	82,131
Fertilizing material.....	8,321 tons.....	8,321	72,710
Merchandise.....	12,465 tons.....	12,465	3,024,250
Peanuts.....	37,878 bags.....	1,250	95,000
Lumber.....	325,000 feet b. m.....	487	5,200
Railroad ties.....	36,000.....	4,500	21,000
Sand and gravel.....	11,585 tons.....	11,585	8,689
Total.....		46,900	3,318,908

Returns for arrivals and departures of vessels too incomplete for report.

6. HARBOR AT CAPE CHARLES CITY, VA.

No work, either of improvement or maintenance, was done during the year. An examination of the harbor was made in July, 1915. The funds expended, amounting to \$71.21, were in connection with this examination.

APPROPRIATIONS.

Present project:

Sept. 19, 1890.....	\$25,000
July 13, 1892.....	10,000
Mar. 3, 1899.....	20,000
June 13, 1902.....	20,000
Mar. 3, 1905.....	25,000
Mar. 2, 1907.....	25,000
June 25, 1910.....	20,000
Total.....	145,000
Received by annulment of contract.....	250
Aggregate.....	145,250

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Class.	American.	Total.	Aggregate net registered tonnage.	Passengers.
Registered:				
Steamers.....	¹ 19	¹ 19	4,463	152,068
Sailing.....	18	18	685	
Barges.....	² 10	² 10	14,740	
Unregistered:				
Steamers.....	1	1	23	
Gas.....	³ 104	³ 104	861	
Sailing.....	³ 82	³ 82	679	
Total.....	234	234	21,451	152,068

¹ Eleven of these steamers made 5,208 round trips during the calendar year 1915.² These 10 barges made 4,468 round trips during the calendar year 1915.³ These gasoline and sail boats are licensed under 20 tons.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.
				Miles.
Cotton.....	29,394 tons.....	29,394	\$5,378,300	36
Fruit and vegetables.....	169,330 tons.....	169,330	8,466,500	36
Lumber.....	1,206,930,666 feet b. m. .	1,810,396	36,207,919	36
Oil, miscellaneous.....	92,013 tons.....	92,013	2,622,370	36
Pig iron.....	263,847 tons.....	263,847	5,276,940	36
Sugar.....	8,940 tons.....	8,940	1,072,800	36
Miscellaneous ¹	719,468 tons.....	719,468	143,893,600	36
Total.....		3,093,388	208,418,929	.....

¹ Includes agricultural products, groceries, dry goods, agricultural implements, and other manufactured articles, the quantities and values of which it has been impossible to ascertain.

7. ONANCOCK RIVER, VA.

No work was done for improvement or maintenance. An inspection of the channel was made in August, 1915. The funds expended, amounting to \$21.10, were in connection with this inspection.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 517).....	\$20,511
Present project:	
June 25, 1910.....	\$13,500
Mar. 4, 1913.....	1,000
	14,500
Total of appropriations.....	85,011

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Class.	American.	Aggregate net registered tonnage.	Passengers.
Registered:			
Steamers.....	3	1,740	4,336
Sailing and barges.....	30	655	.....
Total.....	33	2,395	4,336

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.
				<i>Miles.</i>
Brick.....	100,000 brick.....	223	\$300	60
Canned goods.....	1,300 tons.....	1,300	144,000	(¹)
Cement.....	200 tons.....	200	2,000	130
Coal.....	2,315 tons.....	2,315	6,945	130
Fish and oysters.....	1,325 tons.....	1,325	182,500	(¹)
Lime.....	100 tons.....	100	500	40
Lumber.....	406,000 feet.....	609	12,180	100
Poultry and live stock.....	1,200 tons.....	1,200	240,000	(¹)
Produce.....	5,950 tons.....	5,950	476,000	(¹)
Sand and gravel.....	1,000 tons.....	1,000	2,000	130
Shingles.....	200,000.....	100	2,000	(¹)
Miscellaneous ²	5,724 tons.....	5,724	572,400	75
Total.....		21,046	1,641,325	(¹)

¹ Not known.² Includes agricultural implements, dry goods, groceries, and other manufactured articles the quantities and values of each of which it has been impossible to ascertain.

The usual limit of draft for loaded vessels is 7 feet.

8. WATERWAY FROM NORFOLK, VA., TO THE SOUNDS OF NORTH CAROLINA.

In connection with the maintenance of this project, the wreck of a small motor freight boat was removed from Deep Creek, Va., at a total cost of \$78.84.

APPROPRIATIONS.

Present project:

Mar. 3, 1899.....	\$25,000
June 6, 1900.....	200,000
Mar. 3, 1901.....	29,870
Mar. 3, 1905.....	3,000
Mar. 2, 1907.....	5,000
June 25, 1910.....	5,000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	5,000

Total of appropriations..... 272,870

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Class.	American.	Aggregate net registered tonnage.
Registered:		
Steamers.....	1,424	55,440
Sailing.....	286	45,780
Barges.....	1,137	376,570
Unregistered:		
Small craft.....	551	11,020
Rafts.....	77	(¹)
Total.....	3,475	488,790

¹ Not known.

The usual limit of draft for loaded vessels is from 5 to 9 feet.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	907,000.....	2,267	\$7,266
Coal.....	35,155 tons.....	35,155	105,465
Cement.....	8,075 tons.....	8,075	80,750
Fertilizer.....	40,875 tons.....	40,875	1,236,260
Grain.....	24,000 bushels.....	600	24,000
Gravel and sand.....	12,700 tons.....	12,700	25,426
Lath.....	3,536,960.....	884	8,842
Logs.....	1,231,796 feet.....	24,635	123,179
Lumber.....	138,076,817 feet.....	207,105	4,142,304
Piling.....	182,400 feet.....	3,648	18,240
Props, mine.....	1,445,789 feet.....	14,457	72,289
Salt.....	4,133 tons.....	4,133	41,330
Shells.....	5,000 tons.....	5,000	10,000
Shingles.....	830,000.....	415	2,125
Staves.....	6,046,000.....	4,215	60,460
Ties, railroad.....	4,987.....	148	1,248
Wood, cord.....	7,996 cords.....	5,992	23,988
Miscellaneous ¹	43,375 tons.....	43,375	4,337,500
Total.....		413,679	10,310,660

¹ Includes agricultural products, groceries, dry goods, agricultural implements, and other manufactured articles, quantities and values of each of which it has been impossible to ascertain.

9. INLAND WATERWAY FROM NORFOLK, VA., TO BEAUFORT INLET, N. C.

The following is a detailed account of work and expenditures under this project during the fiscal year ending June 30, 1916:

DREDGING.

Dredging in accordance with the approved project was carried on during the fiscal year at the localities named in the following tables:

Dredging by contract.

Location.	Contractor.	Cubic yards (place measurement) dredged during year.	Unit price.	Cost of work during year.	Per cent of contract completed.
Coinjock Bay and North Carolina Cut.	P. Sanford Ross (Inc.), Jersey City, N. J.	105,916.00	\$0.0948	¹ \$13,971.46	100
Lower North Landing River, N. C.	Bowers-Southern Dredging Co., Galveston, Tex.	772,980.59	.059	² 45,678.08	100
Virginia Cut.....	P. Sanford Ross (Inc.), Jersey City, N. J.	818,688.00	.14	³ 130,174.80	88
Total.....		1,697,584.59		189,824.34	.....

¹ Includes payments amounting to \$3,930.62 for time expended in removing logs and stumps and for additional labor and material employed in clearing right of way.

² Includes payments amounting to \$72.23 for time expended in removing logs and stumps.

³ Includes payments amounting to \$15,557.08 for time expended in removing logs and stumps.

Dredging by hired labor.

Location.	Name of dredge.	Cubic yards (place measurement) dredged during year.	Cost of work during year.	Cost per cubic yard.
Lower North Landing River, Va.....	U. S. Currittuck....	133,797	\$9,954.06	\$0.074
North River, N. C.....	do.....	84,959	7,998.70	.094
Virginia Cut.....	do.....	679,030	82,421.64	.121
Total.....	.....	898,416	100,374.40	.....

All dredging was done by the hydraulic process. The material dredged consisted of sand, clay, and mud, the sand being in greater quantity than the other materials. In North River and Virginia Cut numerous buried logs, stumps, and roots were encountered in dredging, rendering progress slow and the cost of the work high.

BRIDGES.

The United States is required to maintain three highway bridges which carry county roads across the waterway at Great Bridge, Va.; North Landing, Va.; and at Coinjock, N. C.

As the old bridges were in a bad state of preservation and could not be altered to meet the waterway dimensions of the existing project, a contract was entered into with the Penn Bridge Co., of Beaver Falls, Pa., on June 10, 1914, after canvassing bids in the usual manner, for the removal of the old bridges and the construction of three steel highway bridges of the Strauss type for \$82,890. The last bridge was accepted and the contract completed on March 9, 1916.

MISCELLANEOUS.

In addition to the items given above, necessary minor operations incidental to the deepening and enlargement of the waterway were carried on. Where Government plant was employed in dredging, the right of way and existing channel were cleared of obstructions preparatory to dredging operations and levees and bulkheads were built around dumping grounds a considerable distance in advance of the dredge. The cost of the preparatory work is included in the cost of dredging given above for dredging with hired labor.

The necessary surveys were carried on and supervision maintained in connection with work being done by contract and by hired labor.

The expenditures during the fiscal year, exclusive of outstanding liabilities, amounted to \$457,979.87, which was applied to dredging, the construction of three highway bridges, work preparatory to dredging, surveys, and to administration, supervision, and other incidental expenses. Of this amount \$3,600 was for maintenance, which consisted in snagging in various parts of the waterway. In addition to the total expenditures as shown above, \$500 was, by authority of the Secretary of War, applied to the removal of stumps, snags, and logs from the channel of Pokety Creek, Va., a tributary of the waterway.

APPROPRIATIONS.

Previous projects: Amount appropriated for Southern Branch Elizabeth River, Va.; North Landing River, Va., and N. C.; Currituck Sound, Coinjock Bay, and North River Bar, N. C.; and inland water route from Norfolk Harbor, Va., to Albemarle Sound, N. C., through Currituck Sound (see H. Doc. No. 1491, 63d Cong., 3d sess., pp. 489, 447, 509, and 510)-----		\$344,900.00
Present project:		
July 25, 1912-----	\$600,000.00	
Mar. 4, 1913-----	800,000.00	
Mar. 4, 1915:		
Allotted Apr. 2, 1915-----	\$228,000.00	
By transfer from various appropriations for "Improving Harbor at Norfolk, Va."-----	174,000.00	
	400,000.00	
July 27, 1916-----	1,000,000.00	
		2,800,000.00
Total of appropriations-----		3,144,900.00
By transfer to Pokety Creek, Va. (allotted Nov. 2, 1915)-----		500.00
		3,144,400.00
Net total-----		3,144,400.00
Receipts from sales (previous projects):		
Received from sale of property-----	\$2,479.59	
Received as compensation for damages to U. S. snag boat <i>Roanoke</i> -----	216.41	
		2,696.00
Receipts from sales (present project):		
Received from sales-----	285.20	
Credited to "Miscellaneous receipts"-----	98.33	
		166.87
Grand total-----		3,147,262.87

CONTRACTS IN FORCE.

DREDGING.

Contractor: P. Sanford Ross (Inc.)
 Date of contract: March 14, 1914.
 Date of approval: March 24, 1914.
 Date fixed for commencement: June 28, 1914.
 Date fixed for completion: March 28, 1915.
 Amount of contract: 1,155,000 cubic yards, place measurement.
 Price bid per cubic yard: 9.48 cents per cubic yard, place measurement.
 Completed August 17, 1915.

Contractor: Bowers Southern Dredging Co.
 Date of contract: May 29, 1914.
 Date of approval: June 28, 1914.
 Date fixed for commencement: October 1, 1914.
 Date fixed for completion: July 17, 1916.
 Amount of contract: 1,900,000 cubic yards.
 Unit price: 6.9 cents per cubic yard, place measurement.
 Completed July 9, 1915.

BRIDGES.

Contractor: Penn Bridge Co.
 Date of contract: June 10, 1914.
 Date of Approval: June 29, 1914.
 Date fixed for commencement: October 8, 1914.

Date fixed for completion: July 8, 1915.
 Amount of contract: \$82,890.
 Completed March 9, 1916.

DREDGING.

Contractor: Bowers Southern Dredging Co.
 Date of contract: June 29, 1914.
 Date fixed for commencement: November 23, 1914.
 Date fixed for completion: June 7, 1916.
 Amount of contract: 1,700,000 cubic yards, place measurement.
 Unit price: 5.9 cents per cubic yard, place measurement.
 Completed August 13, 1915.

COAL.

Contractor: Nottingham & Wrenn Co.
 Date of contract: May 26, 1915.
 Date fixed for commencement: June 9, 1915.
 Date fixed for completion: December 31, 1915.
 Amount of contract: 3,000 short tons, more or less.
 Unit price: \$2.50 per short ton, more or less, according to analysis.
 Completed December 31, 1915.

DREDGING.

Contractor: P. Sanford Ross (Inc.).
 Date of contract: August 19, 1915.
 Date fixed for commencement: December 2, 1915.
 Date fixed for completion: December 16, 1916.
 Amount of contract: 850,000 cubic yards, place measurement.
 Unit price: 14 cents per cubic yard, place measurement.
 Per cent of completion: 86.2.

REPAIRS TO DREDGE CURBITUCK.

Contractor: F. O. Smith Shipbuilding & Dry Dock Co.
 Date of contract: September 20, 1915.
 Date fixed for commencement: September 25, 1915.
 Date fixed for completion: October 11, 1915.
 Amount of contract: \$4,314.31, more or less.
 Completed October 25, 1915.

COAL.

Contractor: Castner, Curran & Bullitt (Inc.).
 Date of contract: December 31, 1915.
 Date fixed for commencement: January 21, 1916.
 Date fixed for completion: June 30, 1916.
 Amount of contract: 3,000 short tons, more or less.
 Unit price: \$2.39 per short ton, more or less, according to analysis.
 Completed June 30, 1916.

DERRICK BOAT NO. 14.

Contractor: W. E. Thomas & Co.
 Date of contract: June 19, 1916.
 Date fixed for commencement: September 4, 1916.
 Date fixed for completion: November 5, 1916.
 Amount of contract: \$17,607.90.
 Unit price: \$17,607.90.
 Per cent of completion: Work not begun.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

See report upon "Operating and care of the inland waterway from Norfolk, Va., to Beaufort Inlet, N. C."

10. OPERATING AND CARE OF THE INLAND WATERWAY, NORFOLK, VA., TO BEAUFORT INLET, N. C.

The portion of the inland waterway from Norfolk, Va., to Beaufort Inlet, N. C., which lies between Norfolk, Va., and Albemarle Sound, N. C., was operated during the fiscal year under an allotment from the permanent indefinite appropriation (sec. 6, act Mar. 3, 1909) for operating and care of canals and other works of navigation at an expenditure of \$15,744.87.

Navigation was maintained throughout the year.

The work carried on during the fiscal year consisted of the care and operation of the tidal lock near Great Bridge, Va.; the care and operation of three highway bridges crossing the waterway at Great Bridge, Va., North Landing, Va., and at Coinjock, N. C.; the maintenance of a station for the inspection of rafts in North River, N. C.; the partial installation of a plant for water supply, lighting, and fire protection, and ordinary repairs to the lock, piers, fenders, buildings, and property appurtenant to the canal.

All work was performed by hired labor.

There were 5,043 lockages at the Great Bridge Lock during the fiscal year.

SUMMARY OF WORK AND EXPENDITURES.

Office expenses and supervision	\$1,308.35
Services of regular canal force	8,273.87
Repairs to lock, piers, and fenders	1,811.05
Repairs to buildings and bridges	1,000.00
Repairs to telephone line	91.98
Water supply, lighting, and fire protection	382.54
Tools and minor additions to plant	82.45
Care and repairs to plant	892.90
Fuel, oil, and supplies	662.66
Contingencies	1,239.27
Total	15,744.87

Expenditures to date for operating and care of the part of inland waterway, Norfolk, Va., to Beaufort Inlet, N. C., lying between Norfolk, Va., and Albemarle Sound, N. C.:

Fiscal year ending June 30:

1913	\$923.23
1914	19,774.01
1915	23,771.66
1916	15,744.87
Total	60,213.77

COMMERCIAL STATISTICS.

REPORT OF TRAFFIC AND COMMERCE THROUGH LOCK AT GREAT BRIDGE, VA.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Classes.	Ameri- can.	Aggre- gate net registered tonnage.
Registered and unregistered: ¹		
Packets.....	2,048	73,751
Tugs.....	1,072	15,740
Government.....	559	5,026
Sailing.....	461	13,407
Barges, canal.....	102	27,550
Barges, other.....	493	73,641
Yachts.....	187	4,434
Small craft.....	1,308	9
Rafts.....	155	
Total.....	6,278	212,557

¹ It is impossible to separate registered and unregistered.

NOTE.—Passengers passed through lock, 7,547; number of lookages, 4,872.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Beverages.....	173 barrels.....	43	\$3,680
Brick.....	135,850.....	304	1,094
Canned goods.....	595 tons.....	595	119,000
Cement.....	3,722 barrels.....	744	7,444
Coal.....	32,008 tons.....	32,008	96,024
Corn.....	49,613 bushels.....	1,240	49,613
Cotton.....	4,156 bales.....	1,039	831,200
Cotton products.....	17 tons.....	17	6,800
Fertilizer.....	3,090 tons.....	3,090	154,800
Fertilizer material.....	1,015 tons.....	1,015	20,450
Fish.....	1,000 tons.....	1,000	100,000
Flour.....	19,155 barrels.....	1,915	114,930
Gasoline.....	637,916 gallons.....	2,551	129,479
Groceries.....	911 tons.....	911	73,880
Hay.....	599 tons.....	599	11,330
Hides.....	11 tons.....	11	4,400
Junk.....	186 tons.....	186	1,116
Logs.....	420,248 cubic feet.....	8,405	53,110
Lumber.....	6,155,596 feet b. m.....	9,235	153,922
Laths.....	80,000.....	20	200
Lime, building.....	2,359 barrels.....	239	2,359
Lime, agricultural.....	627 tons.....	627	4,339
Merchandise, general.....	5,529 tons.....	5,529	552,900
Oats.....	24,099 bushels.....	335	24,099
Oil.....	315,546 gallons.....	1,263	37,877
Oysters.....	41,534 bushels.....	1,663	52,376
Packery-house products.....	1,050 tons.....	1,050	420,000
Poultry.....	55,436.....	98	19,200
Peanuts.....	1,071 bushels.....	18	2,142
Potatoes.....	360,250 bushels.....	14,410	180,125
Piling.....	2,179,740 linear feet.....	43,595	217,974
Salt.....	488 tons.....	488	9,760
Shells, oyster.....	6,000 bushels.....	180	360
Shingles.....	1,032,700.....	516	10,327
Staves.....	8,335,415.....	4,117	58,354
Stock, live.....	564.....	282	84,600
Sugar.....	4,955 barrels.....	743	39,139
Ties, railroad.....	14,646.....	2,979	7,323
Wood, fuel.....	5,773 cords.....	8,659	17,319
Miscellaneous, food.....	3,612 tons.....	3,612	361,100
Miscellaneous, building material.....	2,995 tons.....	2,995	149,810
Total.....		158,644	4,316,776

The usual limit of draft for loaded steam packets, canal barges, and all craft, except barges other than canal barges, is 5 to 6½ feet, carrying approximately 53,763 tons of the above commerce, valued at \$3,772,104. The usual limit of draft for barges, other than canal barges, is 5½ to 8 feet, carrying approximately 61,236 tons of cordwood, logs, lumber, coal, and railroad ties, valued at \$326,698.

11. BLACKWATER RIVER, VA.

No work was done and no expenditures were made upon this improvement during the fiscal year ending June 30, 1916.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 410)-----	\$14,000
Present project, Mar. 2, 1907-----	8,000
Total of appropriations-----	22,000
Received from sales-----	15
Grand total-----	22,015

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Registered steamers, American, 8; aggregate net registered tonnage, 624; passengers, 408.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Cotton.....	260 bales.....	65	\$13,000	25	\$0.0075
Fertilizer.....	7,050 bags.....	705	28,200	35	.0075
Fish.....	1,000 barrels.....	75	10,000	40	.0025
Shingles.....	41,000.....	20	410	40	.0075
Land plaster.....	2,000 bags.....	200	4,000	35	.005
Peanuts.....	30,000 bags.....	1,350	162,000	30	.0075
Potatoes.....	85 barrels.....	6	170	30	.01
Miscellaneous ¹	1,201 tons.....	1,201	120,100	20	.01
Total.....		3,622	337,880	31½	

¹ Includes farm products, dry goods, groceries, and other manufactured articles, the quantities and values of each of which it has been impossible to ascertain.

The usual limit of draft for loaded vessels is from 3 to 7 feet.

12. MEHERRIN RIVER, N. C.

No work was done and no expenditures were made upon this improvement during the fiscal year ending June 30, 1916.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 484)---	\$5,000.00
Present project: ..	
Mar. 2, 1907-----	\$8,000.00
July 27, 1916-----	2,500.00
	8,500.00
Total of appropriations-----	13,500.00

Turned into surplus fund of the Treasury.....	\$415. 47
Net total.....	13, 084. 53
Received from sales.....	10. 00
Grand total.....	13, 094. 53

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Registered steamers, American, 5; aggregate net registered tonnage, 655; passengers, 11,039.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	
Brick.....	3 carloads	36	\$322	55	\$0. 005
Coal.....	70 tons.....	70	496	60	. 0125
Cotton.....	920 bales.....	280	36, 500	40	. 0075
Cotton seed.....	1, 600 bags.....	80	2, 400	50	. 0075
Fertilizer.....	20, 000 bags.....	2, 000	50, 000	45	. 005
Hay.....	30 carloads.....	300	6, 600	35	. 005
Land plaster.....	9, 100 bags.....	910	8, 190	55	. 005
Logs.....	600, 000 feet.....	12, 000	72, 000	10	.....
Peanuts.....	60, 000 bags.....	2, 700	202, 000	45	. 0075
Salt.....	500 bags.....	50	350	40	. 005
Wire.....	4 carloads.....	60	276	50	. 0075
Miscellaneous ¹	5, 400 tons.....	5, 400	975, 000	60	. 01
Total.....		23, 836	1, 354, 428	45 $\frac{1}{4}$	.....

¹Includes farm products, drygoods, groceries, and other manufactured articles, the quantities and values of each of which it has been impossible to ascertain.

The usual limit of draft for loaded vessels is from 4½ to 7 feet.

13. ROANOKE RIVER, N. C.

No work was done upon this improvement during the fiscal year ending June 30, 1916, but an expenditure of \$65.42 was made for inspections and an examination to ascertain the condition of the river.

APPROPRIATIONS.

Present project:		Present project—Contd.	
Mar. 3, 1871.....	\$20, 000. 00	June 3, 1896.....	\$10, 000. 00
June 10, 1872.....	10, 000. 00	Mar. 3, 1905.....	10, 000. 00
Mar. 3, 1873.....	10, 000. 00	Mar. 2, 1907.....	3, 000. 00
June 23, 1874.....	5, 000. 00	July 25, 1910.....	5, 000. 00
Aug. 2, 1882.....	5, 000. 00		
July 5, 1884.....	3, 000. 00	Total of appropri-	
Aug. 5, 1886.....	20, 000. 00	ations.....	246, 000. 00
Aug. 11, 1888.....	40, 000. 00	Amount received from sales	
Sept. 19, 1890.....	25, 000. 00	of property.....	1, 361. 50
July 13, 1892.....	50, 000. 00		
Aug. 13, 1894.....	30, 000. 00	Aggregate.....	247, 361. 50

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Open for commerce the entire year.

Vessel classification.

Class.	American.	Aggregate net registered tonnage.	Passengers.
Registered:			
Steamers.....	2	550	.....
Sailing.....	5	1,065	.....
Unregistered:			
Barges.....	3	366	None.
Motor boats.....	1	.....	None.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.
Logs.....	10,921,145 feet.....	43,472	\$80,393	<i>Miles.</i> 25
Lumber.....	3,215,523 feet.....	4,823	96,465	250
Miscellaneous ¹ ..	40,000 tons.....	40,000	2,040,000	180
		88,295	2,226,859	151½

¹ Includes farm products, dry goods, groceries, manufactured articles, cotton, peanuts, lime, and fertilizer, the quantities and values of each of which it has been impossible to ascertain.

IMPROVEMENT OF RIVERS AND HARBORS IN THE WILMINGTON, N. C., DISTRICT.

REPORT OF CAPT. C. S. RIDLEY, CORPS OF ENGINEERS.

IMPROVEMENTS.

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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 534 TO 597.

1. SCUPPERNONG RIVER, N. C.

No field work was done during the year, no plant being available. The expenditures were \$1,572.18, and were for payment for and alterations to the U. S. dredge *Croatan*, collecting commercial statistics, and office expenses.

APPROPRIATIONS.

Prior to present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 553) - \$8, 000
Present project:

June 18, 1902.....	\$10, 000
Mar. 8, 1905.....	5, 000
Mar. 2, 1907.....	2, 000
Mar. 3, 1909 (allotted Mar. 17, 1909).....	2, 500
June 25, 1910.....	2, 500
July 25, 1912.....	2, 000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	2, 900
	<hr/> 26, 900

Total..... 34, 900

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Gasoline.....	6	58
Sailing.....	8	478
Steamers.....	6	139
Barges.....	3	1,318
Total.....	23	1,993

There are 4 or 5 lighters or flats towed by small gasoline boats doing business on the river.
 Number of passenger transported during the year, 737.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
UPSTREAM.				
Brick.....	44,500	111	\$333.00	Miles. 5
Cattle.....	10 head	3	300.00	5
Cement.....	125 tons	125	1,062.50	5
Coal.....	464 tons	464	1,856.00	8
Cotton seed.....	10 tons	10	420.00	5
Cottonseed hulls.....	78 tons	78	1,004.00	5
Cottonseed meal.....	110 tons	110	3,630.00	5
Dry goods.....	18 tons	18	13,500.00	5
Empty oil barrels.....	76	3	75.00	5
Fertilizer.....	2,130 tons	2,130	74,550.00	6
Fish, fresh.....	375 boxes	38	3,800.00	5
Fish, salt.....	39 barrels	2	200.00	17
Furniture.....	3 tons	3	375.00	5
Gasoline.....	27,500 gallons	96	4,992.00	5
Grain.....	530 bushels	13	416.00	5
Groceries.....	623 tons	623	77,875.00	5
Hardware.....	49 tons	49	6,880.00	5
Hay.....	86 tons	86	2,064.00	5
Horses.....	72 head	36	7,200.00	5
Ice.....	128 tons	128	896.00	5
Kerosene.....	415 barrels	76	2,280.00	5
Lumber.....	56,000 feet b. m.	112	1,120.00	5
Lime.....	311 barrels	39	358.80	5
Do.....	200 tons	200	1,500.00	17
Machinery.....	5 tons	5	500.00	5
Oysters.....	2,200 bushels	88	1,100.00	9
Poultry.....	500 head	1	200.00	5
Potatoes, Irish.....	11,750 bushels	353	11,649.00	5
Potatoes, sweet.....	150 bushels	4	120.00	5
Railroad iron.....	103 tons	103	8,090.00	6
Shells.....	4,500 bushels	113	226.00	11
Salt.....	5,910 sacks	414	3,312.00	14
Soft drinks.....	360 crates	23	736.00	0
Shingles.....	13,020	7	70.00	5
Sand.....	88 tons	88	88.00	5
Vegetables.....	50 packages	3	75.00	5
Total.....		5,755	227,633.30	
DOWNSTREAM.				
Cattle.....	150 head	38	3,800.00	5
Cotton.....	1,282 bales	321	77,040.00	5
Cotton seed.....	194 tons	194	8,148.00	5
Eggs.....	2,187 crates	55	16,500.00	5
Empty oil barrels.....	343	13	325.00	5
Fertilizer.....	152 tons	152	5,320.00	5
Fish, fresh.....	371 boxes	37	3,700.00	5
Fish, salt.....	125 barrels	6	600.00	5
Furniture.....	14 tons	14	1,750.00	9

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
DOWNSTREAM—continued.				<i>Miles.</i>
Grain.....	2,076 bushels.....	52	\$1,664.00	7
Horses.....	26 head.....	13	2,600.00	5
Hogs.....	1,150 head.....	58	11,600.00	5
Poultry.....	6,215 head.....	12	2,400.00	5
Peanuts.....	3,205 bushels.....	45	3,375.00	5
Potatoes, Irish.....	14,078 bushels.....	422	13,926.00	5
Potatoes, sweet.....	2,595 bushels.....	78	2,340.00	5
Timber.....	725,000 feet b. m.....	2,175	6,525.00	15
Wood.....	8 cords.....	8	32.00	15
Total.....		3,693	161,645.00	
RECAPITULATION.				
Total upstream.....		5,755	227,833.30	
Total downstream.....		3,693	161,645.00	
Grand total.....		9,448	389,478.30	

2. SHALLOWBAG BAY, N. C.

No field work was done during the year, no plant being available. The expenditures were \$1,773.92, all for maintenance, and were in payment for hydraulic pipe line dredge *Croatan*, services of tide-gauge reader, and district and field office expenses.

APPROPRIATIONS.

June 25, 1910.....	\$13,750
July 25, 1912.....	1,000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	2,000
July 27, 1916.....	2,000
Total.....	18,750

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing.....	4	87
Gasoline.....	9	85
Steamers.....	1	74
Total.....	14	246

About 20 yachts stopped in for a harbor and supplies during the year.
Number of passengers transported, 7,332.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
INBOUND.			
Brick.....	70,000	175	\$625.00
Coal.....	1,161 tons	1,161	4,644.00
Clams.....	1,225 bushels	61	1,220.00
Cement.....	60 tons	60	510.00
Cottonseed meal.....	25 tons	25	825.00
Cottonseed hulls.....	30 tons	30	890.00
Dry goods.....	81 tons	81	60,750.00
Eggs.....	40 crates	1	300.00
Furniture.....	10 tons	10	1,250.00
Fertilizer.....	75 tons	75	2,625.00
Fish, fresh.....	8,500 boxes	850	85,000.00
Fish, salt.....	700 barrels	35	8,500.00
Grain.....	30,433 bushels	761	24,352.00
Gasoline (bulk).....	15,000 gallons	53	2,544.00
Gasoline.....	964 barrels	169	8,788.00
Groceries.....	1,023 tons	1,023	127,875.00
Horses.....	150 head	75	15,000.00
Hardware.....	254 tons	254	35,550.00
Hay.....	175 tons	175	4,200.00
Ice.....	128 tons	128	896.00
Kerosene (bulk).....	12,500 gallons	63	1,197.00
Kerosene.....	963 barrels	176	8,280.00
Lumber.....	317,000 feet b. m.	684	6,240.00
Lime.....	350 barrels	44	404.80
Machinery.....	108 tons	108	10,800.00
Oysters.....	1,800 bushels	72	900.00
Potatoes, Irish.....	2,190 bushels	66	2,178.00
Potatoes, sweet.....	105 bushels	3	90.00
Salt.....	2,017 sacks	141	1,128.00
Soft drinks.....	700 crates	44	1,408.00
Shingles.....	550,000	275	2,750.00
Tar.....	300 barrels	45	675.00
Timber.....	15,000 feet b. m.	45	135.00
Vegetables.....	630 packages	32	800.00
Wood.....	60 cords	60	240.00
Total.....		7,005	414,579.80
OUTBOUND.			
Cattle.....	151 head	38	3,800.00
Clams.....	1,163 bushels	58	1,160.00
Dry goods.....	5 tons	5	3,750.00
Eggs.....	50 crates	1	300.00
Empty oil barrels.....	500	19	475.00
Fish, fresh.....	8,200 boxes	820	82,000.00
Fish, salt.....	400 barrels	20	2,000.00
Gasoline.....	300 barrels	50	2,750.00
Groceries.....	37 tons	37	4,625.00
Grain.....	750 bushels	19	608.00
Hogs.....	100 head	5	1,000.00
Hardware.....	56 tons	56	7,840.00
Ice.....	3,500 tons	3,500	24,500.00
Lumber.....	27,000 feet b. m.	54	540.00
Oysters.....	300 bushels	12	150.00
Poultry.....	1,200 head	2	400.00
Potatoes, Irish.....	1,250 bushels	38	1,254.00
Potatoes, sweet.....	2,000 bushels	60	1,800.00
Salt.....	120 sacks	8	64.00
Vegetables.....	2,200 packages	110	2,750.00
Watermelons.....	4,000	40	600.00
Wood.....	150 cords	150	600.00
Total.....		5,105	142,972.00
RECAPITULATION.			
Total inbound.....		7,005	414,579.80
Total outbound.....		5,105	142,972.00
Grand total.....		12,110	557,551.80

3. FISHING CREEK, N. C.

The work of the year consisted of snagging for the purpose of clearing the natural channel of obstructions between the mouth and a point 4 miles above. This work has been carried on entirely by Government plant and hired labor, at a cost of \$889.06.

The hoister *Contentnia* started work on this stream on January 25, 1916, and worked until February 2, 1916, when operations were suspended, the stream having been restored to good condition. She removed from the channel 21 logs, 4 stumps, 16 snags, 8 saw logs, and 2 trees, besides cutting and hauling back from the banks 8 trees. This work was accomplished at a cost of \$726.91, which gives a unit cost of \$12.31 per obstruction or threatened obstruction removed. Other expenditures were \$162.15 and were in payment for district and field office expenses.

As a result of the year's work the natural channel is clear of obstructions from the mouth to Mabrys Bridge, 4 miles above the mouth.

APPROPRIATIONS.

Sept. 19, 1890-----	\$10,000	Oct. 2, 1914 (allotted Oct. 7, 1914)-----	\$1,000
July 13, 1892-----	5,000	Mar. 4, 1915 (allotted Apr. 2, 1915)-----	1,000
Mar. 3, 1899-----	7,750	July 27, 1916-----	1,000
June 13, 1902-----	2,000		
Mar. 3, 1905-----	500		
June 25, 1910-----	1,500		
July 25, 1912-----	1,500		
Mar. 4, 1913-----	1,500	Total-----	82,750

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable for about three months in the year, during freshet stages only.

Vessel classification (American registered).

One steamer; net registered tonnage, 46.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
UPSTREAM.				
Cottonseed meal.....	40 tons.....	40	\$1,320.00	Miles. 9
Fertilizer.....	88 tons.....	88	3,080.00	9
Total.....		128	4,400.00	
DOWNSTREAM.				
Cotton seed.....	248 tons.....	248	10,416.00	9
Lumber.....	992,000 feet b. m.....	1,984	19,840.00	21
Timber.....	30,000 feet b. m.....	90	270.00	21
Total.....		2,322	30,526.00	
RECAPITULATION.				
Total upstream.....		128	4,400.00	
Total downstream.....		2,322	30,526.00	
Grand total.....		2,450	34,926.00	

4. WATERWAY CONNECTING SWAN QUARTER WITH DEEP BAY, N. C.

The work for the year consisted of maintenance dredging with the U. S. Snag boat *Trent*, which began work August 27, 1915, and continued until September 8, 1915. While on this work she removed 2,027 cubic yards of mud and sand from a cut 1,200 feet long at the east end of the waterway at a cost of \$564.19, giving a unit cost of 27 cents per cubic yard.

Other expenditures were \$807.89 for purchase of and alterations to hydraulic dredge *Croatan* and \$507.06 for district and field office expenses and commercial statistics. The result of the year's work was to restore the channel to the project dimensions.

APPROPRIATIONS.

June 25, 1910 ----- \$14, 575

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing.....	9	131
Gasoline.....	27	216
Steamers.....	2	57
Total.....	38	404

Number of passengers transported during the year, about 1,200.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
OUTBOUND.			
Cattle.....	461 head.....	115	\$11,500.00
Cotton.....	834 bales.....	209	50,100.00
Cotton seed.....	422 tons.....	422	17,724.00
Eggs.....	1,347 crates.....	34	10,200.00
Empty oil barrels.....	378.....	14	350.00
Fish, fresh.....	1,200 boxes.....	120	12,000.00
Grain.....	66,835 bushels.....	1,671	53,472.00
Hogs.....	3,255 head.....	163	32,600.00
Oysters.....	5,244 bushels.....	210	2,625.00
Poultry.....	8,040 head.....	16	3,200.00
Potatoes, Irish.....	884 bushels.....	27	891.00
Total.....		3,001	194,722.00
INBOUND.			
Brick.....	263,420.....	734	2,202.00
Cement.....	347 tons.....	347	2,949.50
Coal.....	8,224 tons.....	8,224	32,896.00
Cottonseed hulls.....	23 tons.....	23	290.00

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
INBOUND—continued.			
Cottonseed meal.....	48 tons.....	48	\$1,584.00
Dry goods.....	63 tons.....	63	47,250.00
Fertilizer.....	1,066 tons.....	1,066	37,310.00
Furniture.....	6 tons.....	6	750.00
Gasoline.....	640 barrels.....	112	5,524.00
Gasoline (bulk).....	7,773 gallons.....	27	1,295.00
Groceries.....	691 tons.....	691	86,375.00
Hardware.....	140 tons.....	140	19,600.00
Hay.....	67 tons.....	67	1,608.00
Horses.....	77 head.....	39	7,800.00
Ice.....	75 tons.....	75	525.00
Kerosene.....	441 barrels.....	80	2,400.00
Lumber.....	259,000 feet, b. m.....	518	6,180.00
Lime.....	967 barrels.....	121	1,113.20
Lime (bulk).....	30 tons.....	30	225.00
Machinery.....	190 tons.....	190	19,000.00
Piles.....	15.....	4	32.00
Potatoes, Irish.....	494 bushels.....	15	495.00
Salt.....	759 sacks.....	53	424.00
Soft drinks.....	581 crates.....	38	1,152.00
Shingles.....	33,700.....	17	170.00
Total.....		12,726	278,459.70
RECAPITULATION.			
Total outbound.....		3,001	194,722.00
Total inbound.....		12,726	278,459.70
Grand total.....		15,727	473,181.70

5. PAMLICO AND TAR RIVERS, N. C.

The work of the year consisted of dredging for the purpose of obtaining a channel 200 feet wide and 10 feet deep at mean low water from Pamlico Sound to Washington, N. C., and maintaining by snagging a channel from Washington to the mouth of Fishing Creek. This work has been carried on entirely by Government plant and hired labor at a cost of \$25,474.79.

The U. S. hoister *Contentnia* started active operations on Tar River on December 24, 1915, and to January 25, 1916, removed between Greenville and the mouth of Fishing Creek a total of 33 large logs, 9 stumps, 21 snags, 12 saw logs, 10 trees, and 1 old wreck from the channel, and cut and hauled back 20 trees from the banks. This work was accomplished at a cost of \$764.47, which gives a unit cost of \$7.21 per obstruction or threatened obstruction removed.

The U. S. dredge *Hercules* was at work on this improvement at the beginning of the present fiscal year at a point about 200 feet below the Washington and Vandemere railroad bridge. From July 1 to August 11, 1915, inclusive, she removed a total of 43,882 cubic yards of material, 25 logs, and 43 stumps, completing the channel to the bridge. This work was done at a cost of \$8,981.15, or a cost of 20.4 cents per cubic yard, including logs and stumps. In addition \$7,485.09 was paid the appropriation for Cape Fear River, N. C., at and below Wilmington for use of dredge *Hercules* and attendant plant.

Other expenses were \$6,815.30 for payment for and alterations to the hydraulic dredge *Croatan* and \$1,428.78 in payment for district and field office expenses and for collecting commercial statistics.

As a result of the year's work the 200-foot channel has been completed to Washington with a minimum depth of 10 feet, and the channel from Washington to the mouth of Fishing Creek has been thoroughly snagged and is in good condition.

APPROPRIATIONS.

Prior to present project (see H. Doc. 1491, 63d Cong., 3d sess., p. 520) - \$30, 000

Present project:

May 3, 1879	\$8, 000
June 14, 1880	9, 000
Mar. 3, 1881	8, 000
Aug. 2, 1882	10, 000
July 5, 1884	5, 000
Aug. 5, 1886	5, 000
Aug. 11, 1888	10, 000
Sept. 19, 1890	10, 000
July 13, 1892	10, 000
Aug. 18, 1894	10, 000
June 3, 1896	5, 000
Mar. 3, 1899	15, 000
June 13, 1902	85, 500
Mar. 3, 1905	8, 000
Mar. 2, 1907	11, 563
Mar. 3, 1909 (allotted Mar. 18, 1909)	5, 000
June 25, 1910	5, 000
Feb. 27, 1911	5, 000
July 25, 1912	100, 000
Oct. 2, 1914	18, 500
Mar. 4, 1915 (allotted Apr. 2, 1915)	35, 800
July 27, 1916	4, 500
	331, 863
Total	361, 863

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable to Greenville during the entire year; above Greenville during freshet stages only.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Sailing.....	44	561
Steamers.....	12	488
Gasoline.....	40	330
Barges.....	24	9, 393
Total.....	120	10, 772

Number of passengers transported during the year, about 8,000.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton mile.
DOWNSTREAM.					
				<i>Miles.</i>	
Brick.....	500,800	1,282	\$3,756.00	21	(1)
Cotton.....	1,780 bales.....	145	105,800.00	40	\$0.05
Cement.....	438 tons.....	438	3,723.00	26	(1)
Coal.....	8,947 tons.....	8,947	35,788.00	5	(1)
Cotton seed.....	487 tons.....	467	19,614.00	30	.06
Cottonseed hulls.....	655 tons.....	655	8,615.00	41	.044
Cottonseed meal.....	1,206 tons.....	1,206	39,798.00	36	.05
Cottonseed oil.....	1,236 barrels.....	309	35,844.00	48	.031
Dry goods.....	260 tons.....	260	199,500.00	29	.148
Fertilizer.....	3,479 tons.....	3,479	121,765.00	34	(1)
Fish, salt.....	73 barrels.....	4	400.00	22	(1)
Furniture.....	27 tons.....	27	8,375.00	24	.145
Gasoline.....	2,196 barrels.....	384	19,968.00	24	(1)
Grain.....	26,214 bushels.....	655	20,980.00	22	(1)
Groceries.....	2,183 tons.....	2,183	272,875.00	27	.074
Hardware.....	367 tons.....	367	51,380.00	27	.074
Hay.....	462 tons.....	462	11,088.00	26	.069
Horses.....	124 head.....	63	12,400.00	33	.121
Ice.....	1,158 tons.....	1,158	8,106.00	34	(1)
Kerosene.....	2,693 barrels.....	491	14,730.00	34	.044
Laths.....	7,000.....	2	12.00	15	(1)
Lumber.....	34,136,000 feet b. m.....	68,272	682,720.00	36	(1)
Lime.....	1,979 barrels.....	247	2,272.40	29	.062
Miscellaneous.....	15 tons.....	15	1,500.00	48	.042
Machinery.....	660 tons.....	660	60,000.00	12	(1)
Oysters.....	189 bushels.....	8	100.00	15	(1)
Poles.....	700.....	175	1,400.00	38	(1)
Piles.....	216.....	54	432.00	32	(1)
Peanuts.....	7,508 bushels.....	105	7,875.00	48	.042
Plaster.....	5 tons.....	5	60.00	15	.133
Potatoes, Irish.....	1,748 bushels.....	52	1,716.00	18	.111
Potatoes, sweet.....	265 bushels.....	9	270.00	38	.063
Poultry.....	419 head.....	1	200.00	30	.167
Railroad iron.....	320 tons.....	320	9,600.00	30	(1)
Salt.....	5,447 sacks.....	381	3,048.00	31	.048
Soft drinks.....	3,905 crates.....	244	7,808.00	29	.055
Shingles.....	137,500.....	69	\$690.00	29	(1)
Tar.....	152 barrels.....	23	345.00	34	.044
Timber.....	5,055,000 feet b. m.....	15,165	45,495.00	16	(1)
Vegetables.....	20 packages.....	1	25.00	15	(1)
Wood.....	136 cords.....	136	544.00	38	(1)
Total.....		109,201	1,822,497.40		
UPSTREAM.					
Cattle.....	1,034 head.....	259	25,900.00	27	.15
Cement.....	1,450 tons.....	1,450	12,325.00	38	(1)
Cotton.....	4,503 bales.....	1,126	270,240.00	25	.06
Cotton seed.....	3,856 tons.....	3,856	161,952.00	31	.037
Cottonseed hulls.....	2 tons.....	2	26.00	48	.025
Cottonseed meal.....	128 bushels.....	6	120.00	38	(1)
Coal.....	175 tons.....	175	5,775.00	48	.025
Dry goods.....	5,547 tons.....	5,547	22,188.00	38	(1)
Eggs.....	28 tons.....	28	21,000.00	38	.105
Empty oil barrels.....	4,883 crates.....	122	36,600.00	25	.16
Fertilizer.....	2,296.....	86	2,150.00	39	.065
Fertilizer material.....	4,759 tons.....	4,759	166,565.00	40	(1)
Fish, salt.....	12,056 tons.....	12,056	301,400.00	38	(1)
Fish, fresh.....	2,973 barrels.....	149	14,900.00	38	(1)
Groceries.....	23,500 boxes.....	2,350	235,000.00	35	(1)
Grain.....	595 tons.....	595	74,375.00	38	.063
Gasoline (bulk).....	134,241 bushels.....	3,356	107,392.00	30	(1)
Gravel.....	151,205 gallons.....	529	25,892.00	22	(1)
Hardware.....	4,610 tons.....	4,610	8,298.00	38	(1)
Hay.....	47 tons.....	47	6,580.00	40	.05
Hops.....	134 tons.....	134	3,216.00	40	.05
Kerosene (bulk).....	5,182 head.....	259	61,800.00	27	.044
Lumber.....	30,931 gallons.....	154	2,928.00	38	(1)
Lime (bulk).....	3,824,000 feet b. m.....	7,648	76,480.00	16	(1)
Miscellaneous.....	127 tons.....	127	952.50	14	(1)
Machinery.....	198 tons.....	198	19,800.00	25	.06
Oysters.....	95 tons.....	95	9,500.00	34	(1)
Peanuts.....	48,516 bushels.....	1,861	23,262.50	24	(1)
	1,400 bushels.....	20	1,500.00	25	.06

¹ Cargo.

² Carried by owners.

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton mi's.
UPSTREAM—continued.					
Piles.....	65	16	\$128. 00	Miles. 48	(1)
Poultry.....	20,450 head.....	41	8,200. 00	26	\$0.192
Potatoes, Irish.....	10,302 bushels.....	309	10,197. 00	18	.111
Potatoes, sweet.....	7,580 bushels.....	227	6,810. 00	42	.048
Railroad iron.....	215 tons.....	215	6,450. 00	35	(1)
Shells.....	151,181 bushels.....	3,779	7,558. 00	36	(5)
Steel bridge.....	28 tons.....	28	2,050. 00	30	(1)
Shingles.....	19,000.....	10	100. 00	30	(5)
Timber.....	40,275,000 feet b. m.....	120,825	362,475. 00	13	(1)
Tobacco.....	78 tons.....	78	18,720. 00	40	.05
Vegetables.....	179 packages.....	9	225. 00	16	.12
Wood.....	103 cords.....	103	412. 00	31	(1)
Watermelons.....	27,087.....	271	4,065. 00	31	(1)
Total.....		177,515	2,115,005.00		
RECAPITULATION.					
Total downstream.....		109,201	1,822,497.40		
Total upstream.....		177,515	2,115,005.00		
Grand total.....		286,716	3,937,502.40		

¹ Carried by owners.² Cargo.**6. BAY RIVER, N. O.**

No work was done during the year, no plant being available. The expenses, \$1,603.50, were for purchase of the hydraulic pipeline dredge *Croatan*, and \$70.91 for main-office expenses and collecting commercial statistics.

APPROPRIATIONS.

June 25, 1910.....	\$21, 000
July 25, 1912.....	1, 000
Mar. 4, 1913.....	1, 000
Oct. 2, 1914 (allotted Oct. 7, 1914).....	1, 000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	1, 900
July 27, 1916.....	1, 000
Total.....	26, 900

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing.....	5	670
Steamers.....	2	104
Barges.....	2	626
Gasoline.....	10	74
Total.....	19	1,474

Passengers transported during the year, 675.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
UPSTREAM.				<i>Miles.</i>
Brick.....	5,000.....	18	\$89.00	15
Cement.....	2 tons.....	2	17.00	15
Coal.....	28 tons.....	28	112.00	11
Cottonseed hulls.....	367 tons.....	367	4,771.00	15
Cottonseed meal.....	271 tons.....	271	8,943.00	12
Dry goods.....	8 tons.....	8	6,000.00	14
Fertilizer.....	995 tons.....	995	34,825.00	15
Fish, fresh.....	2,150 boxes.....	215	21,500.00	15
Furniture.....	7 tons.....	7	875.00	12
Gasoline.....	100 barrels.....	18	936.00	15
Groceries.....	239 tons.....	239	29,875.00	15
Hardware.....	64 tons.....	64	8,960.00	15
Hay.....	31 tons.....	31	744.00	15
Kerosene.....	115 barrels.....	21	630.00	15
Lumber.....	33,000 feet b. m.....	66	660.00	15
Lime.....	29 barrels.....	4	36.80	15
Do.....	50 tons.....	50	375.00	15
Oysters.....	2,250 bushels.....	90	1,125.00	10
Plas.....	25.....	6	48.00	15
Potatoes, Irish.....	49,930 bushels.....	1,498	49,424.00	10
Shells.....	26,000 bushels.....	650	1,300.00	10
Shingles.....	4,000.....	2	20.00	15
Soft drinks.....	890 crates.....	58	1,792.00	15
Timber.....	1,350,000 feet b. m.....	4,060	12,150.00	10
Total.....		8,751	185,167.80	
DOWNSTREAM.				
Cattle.....	12 head.....	2	300.00	15
Cotton.....	1,726 bales.....	431	103,440.00	12
Cotton seed.....	780 tons.....	780	32,780.00	14
Eggs.....	625 crates.....	16	4,800.00	11
Empty oil barrels.....	160.....	6	150.00	15
Fertilizer.....	450 tons.....	450	15,750.00	12
Grain.....	12,700 bushels.....	318	10,176.00	12
Lumber.....	1,501,000 feet b. m.....	3,002	30,020.00	15
Lime.....	300 barrels.....	38	349.60	10
Potatoes, Irish.....	1,500 bushels.....	45	1,485.00	10
Potatoes, sweet.....	40 bushels.....	1	30.00	10
Timber.....	1,635,000 feet b. m.....	4,905	14,715.00	13
Total.....		9,995	213,975.60	
RECAPITULATION.				
Total upstream.....		8,751	185,167.80	
Total downstream.....		9,995	213,975.60	
Grand total.....		18,746	399,143.40	

7. SOUTH RIVER, N. C.

No field work was done during the year, no plant being available. The expenditures were \$870.90 in payment for alterations to the U. S. hydraulic pipe-line dredge *Croatan* and \$94.80 for collecting commercial statistics and office expenses.

APPROPRIATIONS.

June 28, 1910..... \$18,000

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing.....	6	73
Steamers.....	4	160
Barges.....	5	1,675
Gasoline.....	8	65
Total.....	23	1,973

Passengers transported during the year, about 1,000.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
UPSTREAM.				
Brick.....	52,160	130	\$390.00	<i>Miles.</i> 2
Cement.....	23 tons.	23	195.50	2
Coal.....	45 tons.	45	180.00	3
Cottonseed hulls.....	61 tons.	61	793.00	3
Cottonseed meal.....	127 tons.	127	4,191.00	2
Dry goods.....	4 tons.	4	3,000.00	11
Fertilizer.....	58 tons.	58	2,080.00	11
Groceries.....	74 tons.	74	9,250.00	4
Hardware.....	30 tons.	30	4,200.00	2
Hay.....	17 tons.	17	408.00	6
Kerosene.....	123 barrels.	22	660.00	7
Lumber.....	26,000 feet b. m.	72	720.00	7
Lime.....	30 tons.	30	225.00	11
Machinery.....	5 tons.	5	500.00	2
Oysters.....	1,250 bushels.	50	625.00	11
Shells.....	1,800 bushels.	45	90.00	11
Salt.....	495 sacks.	35	280.00	3
Soft drinks.....	289 crates.	18	576.00	8
Timber.....	3,500,000 feet b. m.	10,500	31,500.00	2
Total.....		11,346	58,813.50	
DOWNSTREAM.				
Cotton.....	29 bales.	7	1,680.00	5
Cattle.....	14 head.	3	300.00	11
Cotton seed.....	696 tons.	696	29,232.00	11
Empty oil barrels.....	232.	9	225.00	7
Furniture.....	2 tons.	2	250.00	11
Grain.....	4,759 bushels.	119	3,808.00	9
Hay.....	4 tons.	4	96.00	11
Lumber.....	4,005,000 feet b. m.	8,010	80,100.00	2
Potatoes, sweet.....	500 bushels.	15	450.00	11
Potatoes, Irish.....	723 bushels.	22	726.00	5
Timber.....	4,803,000 feet b. m.	14,409	43,227.00	12
Vegetables.....	20 packages.	1	25.00	2
Total.....		23,297	160,119.00	
RECAPITULATION.				
Total upstream.....		11,346	59,813.50	
Total downstream.....		23,297	160,119.00	
Grand total.....		34,643	219,932.50	

8. CONTENTNIA CREEK, N. C.

The work of the year consisted of snagging for the purpose of clearing the natural channel of obstructions from the mouth to Snow Hill, 32 miles above the mouth. This work has been carried on entirely by Government plant and hired labor at a cost of \$965.70.

The hoister *Contentnia* began operations on this stream on February 18, 1916, and to March 31, 1916, removed a total of 50 large logs, 33 stumps, 45 snags, 29 saw logs, 11 trees, and 1½ cords of small snags from the channel; and cut and hauled back 177 trees and 14 cords of brush from the banks. This work was accomplished at a cost of \$778.58, which gives a unit cost of \$2.16 per obstruction, or threatened obstruction, removed. Other expenditures were \$187.12, and were in payment for superintendence and district office expenditures.

As a result of the year's work the natural channel is free from obstructions from the mouth to Snow Hill, 32 miles above.

APPROPRIATIONS.

Mar. 3, 1881-----	\$10,000	Mar. 2, 1907-----	\$2,000
Aug. 2, 1882-----	10,000	Mar. 3, 1909 (allotted Dec.	
July 5, 1884-----	5,000	21, 1909)-----	1,000
Aug. 5, 1886-----	15,000	June 25, 1910-----	2,000
Aug. 11, 1888-----	5,000	Feb. 27, 1911-----	1,000
Sept. 19, 1890-----	7,000	July 25, 1912-----	2,000
July 13, 1892-----	7,000	Mar. 4, 1913 (allotted Dec.	
Aug. 18, 1894-----	10,000	24, 1913)-----	1,000
Mar. 3, 1899-----	2,000	Oct. 2, 1914 (allotted Oct.	
June 6, 1900 (allotted Sept.		7, 1914)-----	2,000
3, 1902)-----	500	Mar. 4, 1915 (allotted Apr.	
Apr. 28, 1904 (allotted Jan.		2, 1915)-----	1,000
27, 1905)-----	500		
Mar. 3, 1905-----	1,000	Total-----	85,000

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable during freshet stages only; about three months during the year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered steamers-----	3	131

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
DOWNSTREAM.					
Cotton-----	594 bales-----	148	\$35,520.00	Miles. 12	\$0.08
Cotton seed-----	348 tons-----	348	14,618.00	28	.018
Timber-----	2,300,000 feet b. m.-----	6,900	20,700.00	15	(¹)
Total-----		7,396	70,838.00		
UPSTREAM.					
Coal-----	6 tons-----	6	24.00	12	.06
Cottonseed hulls-----	2 tons-----	2	26.00	20	.042
Cottonseed meal-----	56 tons-----	56	1,848.00	16	.031
Fertilizer-----	2,114 tons-----	2,114	73,990.00	22	.039
Lime-----	26 tons-----	26	196.00	12	.083
Salt-----	100 sacks-----	7	56.00	12	.083
Total-----		2,211	76,139.00		
RECAPITULATION.					
Total downstream-----		7,396	70,838.00		
Total upstream-----		2,211	76,139.00		
Total-----		9,607	146,975.00		

¹ Carried by owners.

9. SMITHS CREEK, N. C.

No field work was done during the year. The expenditures were \$12, and were in payment for office expenses.

APPROPRIATIONS.

June 25, 1910.....	\$16,250
Mar. 4, 1915 (allotted Apr. 2, 1915).....	1,400
Total	17,650

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Classed.	American.	Net registered tonnage.
Registered:		
Steamers.....	1	58
Barges.....	1	424
Gasoline.....	12	126
Sailing.....	5	35
Total.....	19	653

Number of passengers transported during the year, 950.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
OUTBOUND.			
Cattle.....	27 head.....	7	\$700.00
Cotton.....	26 bales.....	7	1,680.00
Cotton seed.....	532 tons.....	532	22,344.00
Empty oil barrels.....	151.....	6	150.00
Furniture.....	3 tons.....	3	375.00
Grain.....	1,827 bushels.....	46	1,472.00
Groceries.....	30 tons.....	30	3,750.00
Lumber.....	200,000 feet b. m.....	400	4,000.00
Oysters.....	75 bushels.....	3	37.50
Poles.....	375.....	94	752.00
Potatoes, Irish.....	1,145 bushels.....	34	1,122.00
Potatoes, sweet.....	887 bushels.....	27	810.00
Shingles.....	28,000.....	14	140.00
Timber.....	240,000 feet b. m.....	720	2,160.00
Total.....		1,922	30,492.50
INBOUND.			
Coal.....	20 tons.....	20	80.00
Cotton.....	34 bales.....	9	2,160.00
Cotton seed.....	8 tons.....	8	335.00
Cottonseed hulls.....	33 tons.....	33	429.00
Cottonseed meal.....	122 tons.....	122	4,026.00
Dry goods.....	3 tons.....	3	2,250.00
Fertilizer.....	80 tons.....	80	2,800.00
Fish, fresh.....	5,558 boxes.....	556	55,600.00
Furniture.....	7 tons.....	7	875.00
Gasoline.....	54 barrels.....	9	468.00
Grain.....	2,195 bushels.....	55	1,760.00
Groceries.....	104 tons.....	104	13,000.00
Hardware.....	15 tons.....	15	2,100.00

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
INBOUND—continued.			
Hay.....	9 tons.....	9	\$216.00
Kerosene.....	43 barrels.....	8	240.00
Laths.....	8,000.....	2	12.00
Lumber.....	118,000 feet b. m.....	236	2,361.00
Lime.....	161 barrels.....	20	184.00
Machinery.....	8 tons.....	8	800.00
Oysters.....	2,726 bushels.....	109	1,362.50
Potatoes, Irish.....	4,310 bushels.....	120	4,257.00
Potatoes, sweet.....	2,810 bushels.....	84	2,520.00
Salt.....	227 sacks.....	16	128.00
Soft drinks.....	815 crates.....	51	1,632.00
Timber.....	760,000 feet b. m.....	2,280	6,840.00
Total.....		3,973	106,435.50
RECAPITULATION.			
Total outbound.....		1,923	39,492.50
Total inbound.....		3,973	106,435.50
Grand total.....		5,896	145,928.00

10. NEUSE AND TRENT RIVERS, N. C.

(A) NEUSE RIVER.

The work of the year consisted of snagging between Newbern and Seven Springs by Government plant and hired labor and of dredging under contract and with Government plant and hired labor at Hampton Shoal, below Newbern.

On April 8, 1916, the U. S. hoister *Contentnia* started work on this stream at a point 75 miles above Wilmington and worked down to a point 26 miles above Wilmington by the 30th of June, 1916. While operating on this stream she removed from the channel 147 snags, 59 stumps, 148 logs, 91 saw logs, 47 trees, and 135 linear feet of old jetty and 4 cords of brush, as well as cutting and hauling from the banks 123 overhanging trees. This work was accomplished at a cost of \$2,040.05, which gives a unit cost of \$3.31 per obstruction or threatened obstruction removed.

Dredge *No. 2* was at work at Hampton Shoal, about 9 miles below Newbern, at the beginning of the fiscal year and to December 15, 1915, removed 145,777.6 cubic yards of material from cuts 50 feet wide, aggregating 39,290 feet in length, dredged to a depth of 8 feet at dead low water (11.3 feet at mean low water). This work was accomplished at a cost of \$18,211.50, giving a unit cost of 12.4 cents per cubic yard.

On December 28, 1915, the U. S. pipe-line dredge *Croatan* started dredging operations in this river at Hampton Shoal and to March 2, 1916, removed 78,386.6 cubic yards of material from cuts 150 feet wide, aggregating 9,150 feet long, dredged to a depth of 8 feet at dead low water, at a cost of \$6,346.11, or a unit cost of 8.09 cents per cubic yard.

Other expenditures were \$8,121.11 and were for special repairs to the dredge *Croatan*, collecting commercial statistics, surveys, superintendence, and district and field office expenses.

APPROPRIATIONS.

June 18, 1878.....	\$40, 000
Mar. 3, 1879.....	45, 000
June 14, 1880.....	45, 000
Mar. 3, 1881.....	30, 000
Aug. 2, 1882.....	¹ 30, 000
July 5, 1884.....	20, 000
Aug. 5, 1888.....	22, 500
Aug. 11, 1888.....	15, 000
Sept. 19, 1890.....	20, 000
July 13, 1892.....	15, 000
Aug. 18, 1894.....	7, 000
June 3, 1896.....	7, 000
Mar. 3, 1899.....	10, 000
June 13, 1902 (allotted July 11, 1902).....	13, 500
June 13, 1902 (allotted June 13, 1904).....	2, 000
Apr. 28, 1904 (allotted Sept. 29, 1904).....	500
Mar. 3, 1905 (allotted Apr. 4, 1905).....	17, 000
Mar. 2, 1907 (allotted Apr. 2, 1907).....	² 19, 750
June 25, 1910 (allotted July 18, 1910).....	21, 000
Feb. 27, 1911 (allotted Mar. 25, 1911).....	4, 000
July 25, 1912 (allotted Sept. 3, 1912).....	2, 000
Mar. 4, 1913 (allotted Apr. 16, 1913).....	³ 7, 000
Oct. 2, 1914 (allotted Oct. 7, 1914).....	25, 000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	20, 500
July 27, 1916.....	2, 000
Total.....	440, 750

CONTRACTS IN FORCE.

Name of contractor: Coastwise Dredging Co., Norfolk, Va.

Date of contract: April 17, 1915.

Date of approval: April 22, 1915.

Date fixed for commencement: May 26, 1915.

Date fixed for completion: Indefinite.

For dredging about 105,000 cubic yards at 13.9 cents per cubic yard, place measurement.

Completed December 15, 1915.

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable from its mouth to Maple Cypress Landing, 25 miles above Newbern, the entire year and from Maple Cypress Landing to Goldsboro, 98 miles above Newbern, during freshet stages only. There is practically no boating above Seven Springs, 75 miles above Newbern.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing.....	61	3, 338
Steamers.....	14	599
Gasoline.....	74	1, 055
Barges.....	79	32, 713
Total.....	228	37, 705

Number of passengers transported during the year, about 6,500.

¹ Part of an appropriation of \$35,000, of which \$5,000 was to be applied to waterway from Newbern to Beaufort.² Original allotment \$18,000 increased by \$1,750 transferred from Trent River.³ Original allotment \$9,000 decreased by \$2,000 transferred to Trent River.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
DOWNSTREAM.				<i>Miles.</i>	
Acid phosphate.....	11,088 tons.....	11,088	\$88,704.00	10	(¹)
Brick.....	177,780.....	444	1,332.00	27	80.02
Cotton.....	8,213 bales.....	803	192,720.00	24	.083
Cotton seed.....	1,097 tons.....	1,097	46,074.00	42	.024
Coal.....	1,121 tons.....	1,121	4,484.00	11	(¹)
Cattle.....	38 head.....	8	1,864.00	24	.166
Cement.....	184 tons.....	184	1,864.00	27	.037
Cottonseed hulls.....	1,067 tons.....	1,067	13,871.00	28	.089
Cottonseed meal.....	1,224 tons.....	1,224	40,392.00	26	.096
Dry goods.....	184 tons.....	164	123,000.00	28	.071
Eggs.....	679 crates.....	17	5,101.00	14	.10
Empty oil barrels.....	982.....	37	925.00	13	.061
Fertilizer.....	2,504 tons.....	2,504	87,640.00	25	.04
Fish, fresh.....	441 boxes.....	44	4,400.00	10	(³)
Fish, salt.....	1,378 barrels.....	69	6,900.00	11	(³)
Fish oil.....	214 barrels.....	54	4,536.00	10	(³)
Furniture.....	73 tons.....	73	9,125.00	24	.08
Gasoline.....	1,591 barrels.....	278	14,456.00	25	(¹)
Gasoline (bulk).....	61,550 gallons.....	180	8,640.00	10	(¹)
Grain.....	22,933 bushels.....	573	18,336.00	24	(¹)
Groceries.....	2,049 tons.....	2,049	256,125.00	27	.087
Hardware.....	419 tons.....	419	58,660.00	24	.042
Hay.....	377 tons.....	377	9,048.00	26	.038
Hogs.....	56 head.....	8	600.00	25	.08
Ice.....	149 tons.....	149	1,043.00	24	(³)
Kerosene.....	865 barrels.....	158	4,740.00	27	.037
Leaths.....	8,800.....	2	12.00	25	(³)
Lumber.....	92,044,000 feet b. m.....	184,088	1,840,880.00	26	(¹)
Lime.....	1,478 barrels.....	185	1,702.00	20	.05
Machinery.....	49 tons.....	49	4,900.00	29	(³)
Oysters, canned.....	3,982 cases.....	50	5,000.00	10	(³)
Poultry.....	2,431 head.....	5	1,000.00	19	(³)
Poles.....	1,750.....	437	3,496.00	10	(³)
Piles.....	25,000.....	8,750	70,000.00	10	(³)
Peanuts.....	178 bushels.....	2	150.00	25	.04
Potatoes, Irish.....	5,011 bushels.....	150	4,950.00	19	(³)
Potatoes, sweet.....	12,791 bushels.....	384	11,520.00	15	(³)
Salt.....	6,427 sacks.....	450	3,600.00	19	.035
Soft drinks.....	8,828 crates.....	552	17,664.00	25	.06
Shells.....	6,326 bushels.....	158	316.00	10	(¹)
Shingles.....	145,000.....	73	730.00	26	(¹)
Tar.....	6 barrels.....	1	15.00	25	.052
Timber.....	21,969,000 feet b. m.....	65,907	197,721.00	18	(³)
Vegetables.....	885 packages.....	44	1,100.00	11	(³)
Wood.....	486 cords.....	486	1,944.00	17	(³)
Watermelons.....	8,496.....	86	1,275.00	10	(³)
Total.....		286,042	3,171,190.00		
UPSTREAM.					
Brick.....	36,900.....	92	276.00	58	.04
Cattle.....	350 head.....	87	8,700.00	25	.16
Cement.....	7,380 tons.....	7,380	62,730.00	10	(¹)
Coal.....	30,710 tons.....	30,710	122,840.00	11	(¹)
Cotton.....	4,369 bales.....	1,092	262,080.00	25	.068
Cotton seed.....	4,993 tons.....	4,993	205,506.00	29	.035
Cottonseed hulls.....	268 tons.....	268	3,484.00	27	.037
Cottonseed meal.....	425 tons.....	425	14,025.00	26	.038
Clams.....	387 bushels.....	19	380.00	29	(³)
Dry goods.....	27 tons.....	27	20,250.00	25	.12
Eggs.....	1,884 crates.....	47	14,100.00	28	.261
Empty oil barrels.....	1,457.....	55	1,375.00	24	.033
Furniture.....	46 tons.....	46	5,750.00	21	.095
Fish, fresh.....	18,785 boxes.....	1,879	187,900.00	16	(³)
Fish, salt.....	1,421 barrels.....	71	7,100.00	25	(³)
Fish oil.....	235 barrels.....	59	4,956.00	34	(³)
Fertilizer fish.....	1,330,000.....	665	1,995.00	10	(³)
Fertilizer.....	15,947 tons.....	15,947	558,145.00	27	(¹)
Fertilizer material.....	12,808 tons.....	12,808	320,200.00	10	(¹)
Gasoline.....	1,845 barrels.....	323	16,796.00	10	(¹)
Gasoline (bulk).....	278,495 gallons.....	975	46,800.00	10	(¹)
Grain.....	88,815 bushels.....	2,220	71,040.00	34	(¹)
Gravel.....	2,500 tons.....	2,500	4,500.00	34	(¹)
Groceries.....	3,871 tons.....	3,871	483,875.00	32	.031
Hardware.....	722 tons.....	722	101,080.00	34	.029
Hay.....	422 tons.....	422	10,128.00	28	.054
Horses.....	27 head.....	14	2,800.00	25	.14
Hogs.....	1,157 head.....	58	11,600.00	24	.083

¹ Cargo.² Carried by owners.

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton mile.
UPSTREAM—continued.				<i>Miles.</i>	
Ice.....	133 tons.....	133	\$931.00	19	\$0.053
Kerosene.....	1,142 barrels.....	208	6,240.00	14	(1)
Kerosene (bulk).....	106,899 gallons.....	534	10,146.00	10	(1)
Lumber.....	4,831,000 feet b. m.....	9,662	96,620.00	22	(1)
Lime.....	1,387 barrels.....	173	1,591.60	21	(1)
Lime (bulk).....	93 tons.....	93	697.50	15	(1)
Machinery.....	30 tons.....	30	3,000.00	12	(2)
Miscellaneous.....	331 tons.....	331	33,100.00	10	.10
Oysters.....	73,202 bushels.....	2,928	21,786.25	20	(2)
Plaster.....	1,634 tons.....	1,634	19,608.00	10	(1)
Poultry.....	13,421 head.....	27	5,400.00	25	(2)
Poles.....	950.....	238	1,904.00	10	(2)
Peanuts.....	965 bushels.....	14	1,050.00	31	.065
Potatoes, Irish.....	17,638 bushels.....	529	17,457.00	16	(2)
Potatoes, sweet.....	24,818 bushels.....	744	22,320.00	21	(2)
Railroad iron.....	4,152 tons.....	4,152	124,560.00	10	(2)
Rosin.....	1,038 barrels.....	166	4,150.00	25	(2)
Salt.....	2,095 sacks.....	147	1,176.00	21	(1)
Salt (bulk).....	5,799 tons.....	5,799	46,392.00	34	(1)
Soft drinks.....	1,470 crates.....	92	2,944.00	29	.055
Shells.....	4,200 bushels.....	105	210.00	16	(1)
Shingles.....	2,000.....	1	10.00	25	.032
Tobacco.....	24,550 pounds.....	12	2,880.00	16	(2)
Turpentine, spirits.....	46 barrels.....	10	1,000.00	25	(2)
Timber.....	8,997,000 feet b. m.....	26,991	80,973.00	18	(2)
Vegetables.....	5,034 packages.....	252	6,300.00	19	(2)
Wood.....	596 cords.....	596	2,384.00	24	(2)
Watermelons.....	27,165.....	272	4,080.00	22	(2)
Total.....		143,548	3,069,321.35		
RECAPITULATION.					
Total downstream.....		286,042	3,171,190.00		
Total upstream.....		143,548	3,069,321.35		
Grand total.....		429,590	6,240,511.35		

¹ Cargo.² Carried by owners.

(B) TRENT RIVER.

No field work was done during the year, no plant being available. The expenditures were \$830.74 and were in payment for alterations to U. S. dredge *Croatan*, surveys, collecting commercial statistics, and office expenses.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 568)--- \$69,000

Present project:

June 13, 1902.....	\$6,500
June 13, 1902 (emergency allotment).....	1,000
Mar. 3, 1905.....	23,000
Mar. 2, 1907 (allotted Apr. 5, 1907).....	¹ 10,250
June 25, 1910 (allotted July 27, 1910).....	15,000
Feb. 27, 1911 (allotted Mar. 31, 1911).....	1,000
July 25, 1912 (allotted Sept. 3, 1912).....	8,000
Mar. 4, 1913 (allotted Apr. 15, 1913).....	² 5,000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	2,000
	71,750

Total..... 140,750

¹Original allotment \$12,000, reduced by \$1,750 transferred to Neuse River.²Original allotment \$3,000, increased by \$2,000 transferred from Neuse River.

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	5	762
Gasoline.....	8	56
Barges.....	17	6,128
Total.....	30	6,460

Passengers transported during the year, 1,606.

Freight traffic in Newbern Harbor.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
EXPORTS.			
Brick.....	236,270	571	\$1,713.00
Cattle.....	32 head.....	8	800.00
Cement.....	178 tons.....	178	1,513.00
Coal.....	1,141 tons.....	1,141	4,564.00
Cottonseed hulls.....	1,125 tons.....	1,125	14,625.00
Cottonseed meal.....	1,420 tons.....	1,420	46,860.00
Dry goods.....	172 tons.....	172	129,000.00
Empty oil barrels.....	71.....	3	75.00
Fertilizer.....	3,929 tons.....	3,929	137,515.00
Fish, salt.....	164 barrels.....	8	800.00
Furniture.....	76 tons.....	76	9,500.00
Gasoline.....	1,475 barrels.....	258	13,416.00
Grain.....	27,018 bushels.....	675	21,600.00
Groceries.....	2,595 tons.....	2,595	324,375.00
Hardware.....	487 tons.....	487	68,180.00
Hay.....	691 tons.....	691	16,584.00
Hogs.....	41 head.....	2	400.00
Ice.....	213 tons.....	213	1,491.00
Kerosene.....	1,128 barrels.....	206	6,180.00
Laths.....	9,100.....	2	12.00
Lumber.....	29,305,000 feet b. m.....	68,610	586,100.00
Lime.....	2,335 barrels.....	292	2,686.40
Machinery.....	56 tons.....	56	5,600.00
Plaster.....	24 tons.....	24	288.00
Potatoes, Irish.....	4,774 bushels.....	143	4,719.00
Potatoes, sweet.....	288 bushels.....	9	270.00
Railroad iron.....	30 tons.....	30	900.00
Salt.....	8,522 sacks.....	597	4,776.00
Soft drinks.....	11,785 crates.....	737	28,584.00
Shingles.....	177,766.....	89	890.00
Tar.....	6 barrels.....	1	15.00
Vegetables.....	310 packages.....	16	400.00
Total.....		74,364	1,429,431.40
IMPORTS.			
Cattle.....	375 head.....	94	9,400.00
Coal.....	4,300 tons.....	4,300	17,200.00
Cotton.....	5,962 bales.....	1,490	357,600.00
Cement.....	665 tons.....	665	5,652.50
Cotton seed.....	3,464 tons.....	3,464	145,488.00
Clams.....	359 bushels.....	18	360.00
Eggs.....	1,439 crates.....	36	10,800.00
Empty oil barrels.....	1,437.....	54	1,350.00
Fertilizer.....	4,447 tons.....	4,447	155,645.00
Fish, fresh.....	11,400 boxes.....	1,140	114,000.00
Fish, salt.....	782 barrels.....	39	3,900.00
Furniture.....	9 tons.....	9	1,125.00
Fish oil.....	92 barrels.....	23	1,932.00
Groceries.....	1,800 tons.....	1,800	225,000.00
Grain.....	71,044 bushels.....	1,776	56,832.00
Gravel.....	2,500 tons.....	2,500	4,500.00
Hogs.....	1,210 head.....	61	12,200.00
Hardware.....	524 tons.....	524	73,360.00

Freight traffic in Newbern Harbor—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
IMPORTS—continued.			
Horses.....	28 head.....	14	\$2,800.00
Lime.....	18 tons.....	18	125.00
Lumber.....	1,915,000 feet b. m.....	3,836	38,860.00
Machinery.....	12 tons.....	12	1,200.00
Oysters.....	30,879 bushels.....	1,235	15,437.50
Poultry.....	12,517 head.....	27	5,400.00
Potatoes, Irish.....	10,060 bushels.....	302	9,965.00
Potatoes, sweet.....	22,504 bushels.....	675	20,250.00
Rosin.....	1,088 barrels.....	166	4,150.00
Salt (bulk).....	5,799 tons.....	5,799	46,392.00
Turpentine, spirits.....	46 barrels.....	10	1,000.00
Tobacco.....	24,060 pounds.....	12	2,880.00
Timber.....	4,424,000 feet b. m.....	13,572	41,616.00
Vegetables.....	2,940 packages.....	147	8,675.00
Wood.....	480 cords.....	480	1,920.00
Watermelons.....	24,479.....	245	8,675.00
Total.....		49,290	1,395,201.00

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
UPSTREAM.				<i>Miles.</i>	
Brick.....	201,639.....	504	\$1,512.00	32	\$0.031
Cement.....	164 tons.....	164	1,394.00	30	.033
Coal.....	262 tons.....	262	1,048.00	29	.034
Cottonseed hulls.....	198 tons.....	198	2,674.00	32	.031
Cottonseed meal.....	237 tons.....	237	7,821.00	33	.03
Cotton seed.....	375 tons.....	375	15,750.00	18	(¹)
Dry goods.....	102 tons.....	102	76,600.00	31	.065
Fertilizer.....	1,307 tons.....	1,307	45,745.00	35	.029
Fish, fresh.....	266 boxes.....	27	2,700.00	32	.047
Fish, salt.....	29 barrels.....	1	100.00	32	.047
Furniture.....	88 tons.....	88	11,000.00	28	.107
Gasoline.....	102 barrels.....	18	936.00	38	.079
Grain.....	18,745 bushels.....	469	15,008.00	23	.052
Groceries.....	350 tons.....	350	43,750.00	29	.088
Hardware.....	181 tons.....	181	25,340.00	21	.119
Hay.....	229 tons.....	229	5,496.00	27	.056
Ice.....	146 tons.....	146	1,022.00	29	.054
Kerosene.....	655 barrels.....	120	3,600.00	28	.063
Lumber.....	267,000 feet b. m.....	534	5,340.00	24	.042
Lime.....	677 barrels.....	84	772.80	28	.086
Machinery.....	96 tons.....	96	9,600.00	28	.089
Oysters.....	765 bushels.....	31	387.50	27	.055
Peanuts.....	225 bushels.....	3	225.00	27	.074
Potatoes, Irish.....	1,850 bushels.....	56	1,848.00	29	.052
Potatoes, sweet.....	237 bushels.....	7	210.00	22	.098
Salt.....	2,165 sacks.....	152	1,216.00	29	.035
Soft drinks.....	1,615 crates.....	101	3,232.00	21	.076
Shingles.....	11,500.....	6	60.00	11	.046
Wood.....	566 cords.....	566	2,264.00	15	(²)
Total.....		6,414	286,451.30		
DOWNSTREAM.					
Cattle.....	143 head.....	36	8,600.00	33	.121
Cotton.....	4,060 bales.....	1,015	243,600.00	31	.065
Cotton seed.....	1,350 tons.....	1,350	56,700.00	34	.029
Cottonseed hulls.....	172 tons.....	172	2,236.00	18	.055
Cottonseed meal.....	72 tons.....	72	2,376.00	18	.055
Eggs.....	418 crates.....	10	3,000.00	37	.081
Empty oil barrels.....	747.....	28	700.00	28	.063
Grain.....	2,150 bushels.....	54	1,728.00	28	.043
Lumber.....	480,000 feet b. m.....	960	9,600.00	18	(²)
Marl.....	4,150 tons.....	4,150	8,300.00	12	(²)

¹ Cargo.² Carried by owners.

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
DOWNSTREAM—Continued.					
Machinery.....	10 tons.....	10	\$1,000.00	18	\$0.130
Poultry.....	750 head.....	3	400.00	38	.184
Potatoes, Irish.....	770 bushels.....	28	780.00	18	.060
Shingles.....	72,000.....	36	360.00	26	.02
Sand.....	3,000 tons.....	3,000	1,800.00	12	(1)
Timber.....	18,151,000 feet b. m.....	30,453	118,359.00	20	(1)
Wood.....	3,172 cords.....	3,172	12,688.00	10	(1)
Total.....		53,543	467,306.00		
RECAPITULATION.					
Total exports.....		74,364	1,439,431.40		
Total imports.....		49,290	1,366,301.00		
Total upstream.....		6,414	289,451.30		
Total downstream.....		53,543	467,306.00		
Grand total.....		183,611	3,578,389.70		

¹ Carried by owners.

11. SWIFT CREEK, N. C.

No field work was done during the year, no plant being available. The expenditures were \$185.48, all for maintenance, and were for payment of outstanding liabilities from the past fiscal year on account of operations of United States plant.

APPROPRIATIONS.

June 25, 1910.....	\$1,600
July 25, 1912.....	500
Mar. 4, 1913.....	500
Oct. 2, 1914 (allotted Oct. 7, 1914).....	500
July 27, 1916.....	1,000
Total.....	4,100

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Gasoline.....	5	40
Steamers.....	2	67
Total.....	7	107

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
UPSTREAM.				<i>Miles.</i>
Cement.....	16 tons.....	16	\$136.00	12
Coal.....	20 tons.....	20	80.00	12
Cottonseed hulls.....	106 tons.....	106	1,265.00	12
Cottonseed meal.....	115 tons.....	115	3,795.00	12
Dry goods.....	1 ton.....	1	750.00	12
Fertilizer.....	305 tons.....	305	10,675.00	12
Fish, fresh.....	33 boxes.....	3	300.00	12
Fish, salt.....	25 barrels.....	1	100.00	12
Furniture.....	15 tons.....	15	1,875.00	12
Gasoline.....	55 barrels.....	10	520.00	12
Grain.....	2,300 bushels.....	56	1,856.00	12
Groceries.....	77 tons.....	77	9,625.00	12
Hardware.....	22 tons.....	22	2,080.00	12
Hay.....	135 tons.....	135	3,240.00	12
Ice.....	109 tons.....	109	783.00	12
Kerosene.....	202 barrels.....	37	1,110.00	12
Lumber.....	90,000 feet b. m.....	180	1,800.00	12
Lime.....	300 barrels.....	38	249.60	12
Machinery.....	10 tons.....	10	1,000.00	12
Peanuts.....	110 bushels.....	2	150.00	12
Salt.....	380 sacks.....	27	216.00	12
Soft drinks.....	1,775 crates.....	111	3,552.00	12
Total.....		1,397	46,337.60	.....
DOWNSTREAM.				
Brick.....	2,000.....	5	15.00	12
Cattle.....	5 head.....	1	100.00	12
Cotton.....	250 bales.....	63	15,120.00	12
Eggs.....	250 crates.....	6	1,800.00	12
Empty oil barrels.....	190.....	7	175.00	12
Grain.....	650 bushels.....	16	512.00	12
Lumber.....	350,000 feet b. m.....	700	7,000.00	7
Poultry.....	1,300 head.....	3	600.00	12
Timber.....	4,443,000 feet b. m.....	13,329	39,987.00	2
Wood.....	45 cords.....	45	180.00	12
Total.....		14,175	65,489.00	.....
RECAPITULATION.				
Total upstream.....		1,397	46,337.60	.....
Total downstream.....		14,175	65,489.00	.....
Grand total.....		15,572	111,826.60	.....

12. INLAND WATERWAY FROM PAMLICO SOUND TO BEAUFORT INLET, N. C.

The work for the year consisted of maintenance dredging under contract and by open market agreement, maintaining and operating the drawbridge over Core Creek, and repairing fender piers.

Under contract with the Rickards Dredging Co. the dredge *Miller* was at work on this waterway at the beginning of the year. To July 13, 1915, inclusive, she removed from shoals at and below the mouth of Core Creek, from cuts aggregating 1,650 feet in length, 125 feet wide, and 10 feet deep, a total of 21,407.18 cubic yards of material, place measurement. This work was accomplished at a cost of \$3,727.41, which gives a unit cost of 17.4 cents per cubic yard.

Under open market agreement with the Rickards Dredging Co., of Philadelphia, Pa., the dredge *Miller* began dredging on this waterway on August 14, 1915, and to September 13, 1915, removed from a shoal about 1 mile above Core Creek Bridge a total of 10,028.52 cubic yards of material from a cut 2,000 feet in length, 90 feet wide, and 10 feet

deep. There was expended on this work \$1,014.82, giving a unit cost of 11 cents per cubic yard.

Other expenditures were \$1,377 for operating draw; \$516.99 for maintaining draw and repairs to fenders; \$862.28 for superintendence, surveys, and field office expenses; and \$440.24 for main office and collecting commercial statistics.

APPROPRIATIONS.

Mar. 2, 1907.....	\$200,000.00	Oct. 2, 1914.....	\$3,400.00
May 27, 1908.....	170,000.00	Mar. 4, 1915 (allotted Apr.	
Mar. 4, 1909.....	135,000.00	2, 1915).....	9,000.00
June 25, 1910.....	10,000.00	July 27, 1916.....	6,500.00
July 25, 1912.....	2,000.00		
Mar. 4, 1913 (allotted July		Total.....	536,500.00
18, 1914).....	600.00		

CONTRACTS IN FORCE.

Name of contractor: The Rickards Dredging Co., Philadelphia, Pa.

Date of contract: April 12, 1915.

Date of approval: April 21, 1915.

Date fixed for commencement: May 28, 1915.¹

Date fixed for completion: July 18, 1915.

For dredging about 17,000 cubic yards at 10.5 cents per cubic yard, place measurement.

Completed to June 30, 1916: 100 per cent.

COMMERCIAL STATISTICS.

Report of vessels passing through Core Creek drawbridge during the calendar year 1915.

Classes.	North-bound.	South-bound.	Total.
From Jan. 1 to June 30, 1915:¹			
Yachts.....	159	82	241
Steamers.....	54	57	111
Tugs.....	60	62	122
Barges.....	80	87	167
Schooners.....	102	105	207
Launches.....	438	464	902
Sharpies.....	304	343	647
Dredges.....	1	1	2
Pile drivers.....	1	.....	1
Total.....	1,199	1,201	2,400
From July 1 to Dec. 31, 1915:²			
Yachts.....	91	189	280
Steamers.....	64	61	125
Tugs.....	66	64	130
Barges.....	82	88	170
Schooners.....	64	98	162
Launches.....	440	426	866
Sharpies.....	269	285	554
Dredges.....	2	2	4
Pile drivers.....	.....	1	1
Total.....	1,078	1,209	2,287

Season of navigation, 1915: Navigable the entire year.

¹ This time was waived for a reasonable period.

² Draw opened 1,308 times; time open, 143 hours 30 minutes; average time open, 6.13 minutes.

³ Draw opened 1,220 times; time open, 134 hours 50 minutes; average time open, 6.13 minutes.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing.....	47	1,122
Gasoline.....	85	1,360
Barges.....	27	11,970
Steamers.....	14	740
Total.....	173	15,192

In addition to the boats that use this waterway regularly there were from 250 to 300 yachts and steamers that passed through.

Number of passengers transported during the year, about 1,600.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
SOUTHBOUND.				<i>Miles.</i>
Brick.....	108,300	271	\$513.00	20
Cattle.....	719 head	180	18,000.00	20
Cement.....	6,651 tons	6,651	56,533.50	20
Coal.....	24,910 tons	24,910	96,640.00	20
Cotton.....	11 bales	3	720.00	18
Cotton seed.....	23 tons	23	966.00	18
Cottonseed hulls.....	243 tons	243	3,159.00	17
Cottonseed meal.....	289 tons	289	9,537.00	16
Dry goods.....	111 tons	111	83,250.00	20
Empty oil barrels.....	339	12	325.00	20
Fertilizer.....	916 tons	916	32,060.00	19
Fertilizer material.....	1,708 tons	1,708	42,700.00	20
Fertilizer fish.....	1,330,000	665	1,995.00	20
Fish, fresh.....	1,827 boxes	183	18,300.00	20
Furniture.....	20 tons	20	2,500.00	19
Gasoline (bulk).....	278,495 gallons	975	46,800.00	20
Gasoline.....	1,436 barrels	251	13,052.00	20
Grain.....	25,371 bushels	634	20,285.00	19
Groceries.....	3,019 tons	3,019	\$77,375.00	20
Gravel.....	6,063 tons	6,063	10,913.40	20
Hardware.....	199 tons	199	27,860.00	20
Hay.....	75 tons	75	1,800.00	18
Hops.....	20 head	1	200.00	20
Horses.....	6	1	200.00	20
Ice.....	6 tons	6	42.00	20
Kerosene.....	1,676 barrels	306	9,180.00	20
Kerosene (bulk).....	106,889 gallons	534	10,146.00	20
Laths.....	6,300	2	12.00	20
Lumber.....	224,000 feet b. m.	468	4,680.00	19
Lime.....	503 barrels	63	5,790.00	19
Machinery.....	68 tons	68	6,800.00	18
Oysters.....	42,323 bushels	1,693	6,348.75	20
Plaster.....	1,634 tons	1,634	19,608.00	20
Poles.....	122	31	248.00	20
Potatoes, Irish.....	5,395 bushels	162	5,346.00	20
Railroad iron.....	4,122 tons	4,122	128,680.00	20
Salt.....	7,036 sacks	493	3,944.00	20
Soft drinks.....	6,155 crates	385	12,320.00	20
Shingles.....	197,206	99	990.00	17
Tar.....	6 barrels	1	15.00	20
Vegetables.....	252 packages	13	325.00	20
Wood.....	252 cords	252	1,008.00	20
Miscellaneous.....	158 tons	158	15,800.00	20
Total.....		57,894	1,087,089.25	.....
NORTHBOUND.				
Acid phosphate.....	11,088 tons	11,088	88,704.00	20
Cattle.....	64 head	16	1,600.00	6
Coal.....	166 tons	166	664.00	5
Cotton.....	1,725 bales	431	103,440.00	20
Cottonseed.....	1,175 tons	1,175	49,350.00	20
Clams.....	251 bushels	13	260.00	20
Eggs.....	495 crates	12	3,600.00	16
Empty oil barrels.....	1,163	44	1,100.00	20
Fertilizer.....	4,345 tons	4,345	152,075.00	20

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
NORTHBOUND—continued.				<i>Miles.</i>
Fish, fresh.....	2,141 boxes.....	214	\$21,400.00	20
Fish, salt.....	2,984 barrels.....	149	14,900.00	20
Fish oil.....	780 barrels.....	195	16,380.00	20
Furniture.....	15 tons.....	15	1,875.00	8
Gasoline.....	103 barrels.....	18	984.00	20
Gasoline (bulk).....	51,550 gallons.....	180	8,640.00	20
Grain.....	757 bushels.....	19	608.00	7
Groceries.....	7 tons.....	7	875.00	20
Hardware.....	1 ton.....	1	140.00	20
Hogs.....	354 head.....	18	3,600.00	8
Kerosene.....	34 barrels.....	6	180.00	19
Lumber.....	23,799,000 feet b. m.....	47,598	475,980.00	20
Oysters, canned.....	3,983 cases.....	50	5,000.00	20
Oysters.....	1,454 bushels.....	58	725.00	20
Poultry.....	2,246 head.....	4	800.00	9
Poles.....	300.....	75	600.00	20
Piles.....	35,000.....	8,750	70,000.00	20
Potatoes, Irish.....	2,488 bushels.....	75	2,475.00	16
Potatoes, sweet.....	20,343 bushels.....	610	18,300.00	19
Roastin.....	1,038 barrels.....	166	4,160.00	20
Shingles.....	2,000.....	1	10.00	20
Shells.....	11,250 bushels.....	281	562.00	20
Tobacco.....	7 tons.....	7	1,680.00	20
Turpentine, spirits.....	46 barrels.....	10	1,000.00	20
Tar.....	12 barrels.....	2	80.00	20
Timber.....	2,023,000 feet b. m.....	6,069	18,207.00	10
Vegetables.....	1,158 packages.....	58	1,450.00	17
Wood.....	21 cords.....	21	84.00	11
Watermelons.....	25,208.....	252	3,780.00	19
Total.....		82,199	1,075,160.00	
RECAPITULATION.				
Total southbound.....		57,804	1,087,039.25	
Total northbound.....		82,199	1,075,160.00	
Grand total.....		140,003	2,162,199.25	

During the calendar year 1915, incident to the construction by the United States of the breakwater at Cape Lookout, a total of 109,640 tons of stone, valued at \$178,713 moved through this waterway which commerce is not included in the above statement.

13. HARBOR OF REFUGE AT CAPE LOOKOUT, N. C.

The work for the year consisted of maintenance of sand fences, construction of motor survey boat *Neuse*, tide and wind observations, proceedings for the acquisition of land desired, surveys, and construction of breakwater, the total cost of this work being \$578,406.27. The work of maintenance of sand fences, tide and wind observations, and surveys was done by hired labor. The construction of motor survey boat *Neuse* and construction of breakwater have been under contract.

There are now 5,610 linear feet of sand fences, of which 1,188 linear feet are planked to a height of 5½ feet, 1,136 linear feet planked to a height of 5 feet, 864 linear feet planked to a height of 4½ feet, 546 linear feet planked to a height of 4 feet, 1,252 linear feet planked to a height of 3 feet, and 624 linear feet planked to a height of 2½ feet. These fences have caught and retained drifting sand to the height of their planking. Sea oats have been planted to assist in retaining this sand. The cost of the sand fences for the year was \$608.88.

An automatic tide gauge and anemometer were installed and a record has been kept of both the tide and wind movement.

The board of commissioners appointed to appraise the land required for breakwater-construction purposes filed a report on July 5, 1915, giving their appraisement at \$1,760. Exceptions were filed by some of the claimants, and a special term of court was held in October, 1915, and the value of the land fixed at \$1,800. This amount was paid into the court March 17, 1916.

The John F. Bell Co., of Morehead City, N. C., completed the construction of the motor survey boat *Neuse* on July 23, 1915. The contractor's earnings to June 30, 1916, were in all \$3,458.12; salary of inspector, purchase of part of equipment, and superintendence amounted to \$1,800.

D. L. Taylor & Co., of Medina, N. Y., deposited 282,050.84 tons of stone in the breakwater under contract during the fiscal year at a cost of \$558,460.66, giving a total cost to the end of the fiscal year of \$558,762.47, or a gross cost to the United States of \$1.98 per ton of stone deposited in the breakwater.

Other expenditures were \$13,776.80, and were for superintendence and district office expenses.

The inner end of the breakwater now showing above low water level is 1,550 feet from the shore, and the outer end is 3,400 feet from the shore. The inner end of the mattress stone in place is 1,350 feet from the shore line and the outer end is 3,640 feet from the shore line. The total length of the breakwater, exclusive of the shore connection, when completed, will be 7,000 feet.

The project is now 23.1 per cent completed.

APPROPRIATIONS.

July 25, 1912.....	\$300,000
Mar. 4, 1913.....	500,000
July 1, 1916.....	600,000
Total.....	1,400,000

CONTRACTS IN FORCE.

Name of contractor: John F. Bell Co., Morehead City, N. C.
 Date of contract: October 20, 1914.
 Date of approval: November 13, 1914.
 Date fixed for commencement: December 4, 1914.
 Date fixed for completion: June 24, 1915.
 For constructing one motor survey boat *Neuse*.
 Completed July 23, 1915.

Name of contractor: D. L. Taylor & Co., Medina, N. Y.
 Date of contract: March 2, 1915.
 Date of approval: March 29, 1915.
 Date fixed for commencement: October 2, 1915.
 Rate required: 27,000 short tons per working month.
 Amount of contract: 636,363 short tons.
 Date fixed for completion: Indefinite.
 For construction of breakwater and shore connection at Cape Lookout, N. C.
 Completed to June 30, 1916: 44.5 per cent.

14. BEAUFORT HARBOR, N. C.

The work of the year consisted of dredging with United States plant and hired labor. The U. S. hydraulic pipe-line dredge *Croatan* started work on the bulkhead channel in the vicinity of Shark Shoal Beacon on June 5, 1916, and to June 7, 1916, removed 1,758 cubic yards of material from a cut 100 feet in width and 175 feet in length; the dredge commenced work on the Gallants Channel between the inland waterway and Beaufort on June 5 and 7, 1916, and to June 13 to 30, 1916, removed 31,422.7 cubic yards of material from cuts 100 feet wide, aggregating 3,425 feet long. This work was done at a cost of \$2,865.91, which gives a unit cost of 9 cents per cubic yard.

Other expenditures were \$8,000 for part payment for hydraulic dredge *Croatan* and \$1,839.33 for harbor line and other surveys, collecting commercial statistics, and district and field office expenses.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 403)----- \$5,000
Present project:

Mar. 3, 1881	\$30,000
Aug. 2, 1882	25,000
July 5, 1884	20,000
Aug. 5, 1886	15,000
Aug. 11, 1888	35,000
Sept. 19, 1890	15,000
July 13, 1892	10,000
June 3, 1896	5,000
June 13, 1902	3,000
Apr. 23, 1904 (emergency allotment of Sept. 1, 1904)	1,000
Mar. 3, 1905	2,000
Mar. 2, 1907	22,000
June 25, 1910	32,676
Feb. 27, 1911	5,000
July 25, 1912	5,000
Mar. 4, 1913	5,000
Oct. 2, 1914 (allotted Oct. 7, 1914)	5,000
Mar. 4, 1915 (allotted Apr. 2, 1915)	17,000
	<hr/> 252,676
Total	<hr/> 257,676

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing	48	398
Barges	27	11,970
Steamers	12	652
Gasoline	97	1,547
Total	184	14,567

Between 250 to 300 steamers and yachts passed through or came in for a harbor during the year. Eleven dump, deck, and derrick scows were used in carrying stone for the harbor of refuge, carrying capacity from 350 to 1,300 cubic yards.

Number of passengers transported during the year, about 9,000.

¹ Part of an appropriation of \$30,000, of which \$5,000 was to be applied to waterway from Newbern to Beaufort.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
Acid phosphate.....	11,088 tons.....	11,088	\$88,704.00
Brick.....	106,910.....	267	801.00
Cattle.....	131 head.....	33	3,300.00
Cement.....	6,866 tons.....	6,866	58,361.00
Coal.....	26,263 tons.....	26,263	105,052.00
Cotton.....	1,600 bales.....	400	96,000.00
Cotton seed.....	1,138 tons.....	1,138	47,796.00
Cottonseed hulls.....	245 tons.....	245	3,185.00
Cottonseed meal.....	334 tons.....	334	11,022.00
Clams.....	3,800 bushels.....	190	3,800.00
Dry goods.....	117 tons.....	117	87,750.00
Eggs.....	606 crates.....	16	4,600.00
Empty oil barrels.....	4,148.....	156	3,900.00
Fertilizer.....	2,738 tons.....	2,738	95,830.00
Fertilizer material.....	1,708 tons.....	1,708	42,700.00
Fertilizer fish.....	37,801,000.....	18,900	56,700.00
Fish, fresh.....	38,927 boxes.....	3,893	399,300.00
Fish, salt.....	2,054 barrels.....	103	10,300.00
Fish oil.....	1,073 barrels.....	268	22,512.00
Furniture.....	28 tons.....	28	3,500.00
Gasoline.....	3,629 barrels.....	635	33,020.00
Gasoline (bulk).....	330,045 gallons.....	1,155	55,440.00
Grain.....	29,016 bushels.....	725	33,200.00
Groceries.....	4,915 tons.....	4,915	614,375.00
Gravel.....	6,063 tons.....	6,063	10,913.40
Hardware.....	281 tons.....	281	39,840.00
Hay.....	201 tons.....	201	4,324.00
Hogs.....	446 head.....	22	4,400.00
Horses.....	10 head.....	5	1,000.00
Ice.....	3,680 tons.....	3,680	25,760.00
Kerosene.....	1,923 barrels.....	351	10,530.00
Kerosene (bulk).....	106,859 gallons.....	334	10,146.00
Leaths.....	6,300.....	2	12.00
Lumber.....	24,590,000 feet b. m.....	49,120	491,200.00
Lime.....	638 barrels.....	80	736.00
Lime (bulk).....	411 tons.....	411	3,082.50
Machinery.....	819 tons.....	819	81,900.00
Oysters, canned.....	18,045 cases.....	228	22,600.00
Oysters.....	118,000 bushels.....	4,730	17,700.00
Poultry.....	8,175 head.....	16	3,200.00
Peanuts.....	149 bushels.....	2	150.00
Poles.....	2,000.....	500	4,000.00
Piles.....	35,130.....	8,783	72,264.00
Potatoes, Irish.....	7,449 bushels.....	223	7,359.00
Potatoes, sweet.....	39,680 bushels.....	1,190	35,700.00
Potatoes, sweet (canned).....	9,600 cases.....	119	9,620.00
Plaster.....	1,634 tons.....	1,634	19,608.00
Rosin.....	1,038 barrels.....	166	4,150.00
Railroad iron.....	4,152 tons.....	4,152	124,560.00
Shells.....	33,683 bushels.....	842	1,684.00
Salt.....	9,623 sacks.....	667	5,336.00
Soft crabs.....	26,000 dozen.....	58	21,750.00
Soft drinks.....	6,563 crates.....	410	13,120.00
Shingles.....	213,200.....	107	1,070.00
Turpentine, spirits.....	46 barrels.....	10	1,000.00
Tar.....	12 barrels.....	2	30.00
Vegetables.....	1,985 packages.....	99	2,475.00
Wood.....	1,428 cords.....	1,428	5,712.00
Watermelons.....	35,457.....	355	5,325.00
Miscellaneous.....	254 tons.....	254	25,400.00
Total.....		160,712	2,948,604.90

During the calendar year 1915, incident to the construction by the United States of the breakwater at Cape Lookout, a total of 109,540 tons of stone, valued at \$178,713, moved through this waterway, which commerce is not included in the above statement.

15. WATERWAY CONNECTING CORE SOUND WITH BEAUFORT HARBOR, N. C.

The work of the year consisted of maintenance dredging for the purpose of restoring the project widths and depths. This work was carried on by United States plant and hired labor.

The U. S. hydraulic pipe-line dredge *Croatan* commenced work on this waterway on May 25, 1916, and to June 5, 1916, removed 21,757.3 cubic yards from three shoals, 550 feet, 300 feet, and 820 feet long, at points, respectively, one-half mile, $1\frac{1}{2}$, and $2\frac{1}{2}$ miles east of Beaufort, restoring the waterway to its project width and depth. This work was done at a cost of \$900, or 4.13 cents per cubic yard.

APPROPRIATIONS.

GOVERNMENT FUNDS.

Mar. 4, 1913.....	\$20, 000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	2, 000
Apr. 29, 1916 (allotted from emergency act of Mar. 4, 1913).....	900
July 27, 1916.....	2, 000
Total.....	24, 900

CONTRIBUTED FUNDS.

By town of Beaufort.....	10, 000
Grand total.....	34, 900

COMMERCIAL STATISTICS.

Season of navigation, 1915: Dredging completed and waterway opened during April; navigable remainder of year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Gasoline.....	55	628
Sailing.....	46	383
Total.....	101	1,011

Number of passengers transported, about 2,000.

The total length of this waterway is $2\frac{1}{2}$ miles. The commerce reported passed over the whole distance.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
EASTBOUND.			
Brick.....	11,410.....	29	\$87. 00
Cement.....	58 tons.....	58	493. 00
Coal.....	788 tons.....	788	3,072. 00
Cottonseed hulls.....	57 tons.....	57	741. 00
Cottonseed meal.....	52 tons.....	52	1,716. 00
Dry goods.....	58 tons.....	58	43,500. 00
Fertilizer.....	286 tons.....	286	10,010. 00
Fertilizer, fish.....	9,746,000.....	4,873	9,746. 00
Fish, salt.....	35 barrels.....	2	200. 00
Furniture.....	33 tons.....	33	4,125. 00
Gasoline.....	162 barrels.....	28	1,456. 00
Grain.....	4,211 bushels.....	105	3,360. 00
Groceries.....	719 tons.....	719	88,875. 00
Hardware.....	174 tons.....	174	24,360. 00
Hay.....	34 tons.....	34	816. 00

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
EASTBOUND—continued.			
Ice.....	26 tons.....	26	\$ 182.00
Kerosene.....	126 barrels.....	23	690.00
Laths.....	3,500.....	1	6.00
Lime.....	64 barrels.....	8	73.60
Lumber.....	96,950 feet b. m.....	194	1,940.00
Machinery.....	6 tons.....	6	600.00
Peanuts.....	57 bushels.....	1	75.00
Potatoes, Irish.....	632 bushels.....	19	627.00
Salt.....	3,000 sacks.....	210	1,680.00
Soft drinks.....	3,260 crates.....	204	6,528.00
Shingles.....	16,400.....	8	80.00
Tar.....	6 barrels.....	1	15.00
Wood.....	187 cords.....	187	748.00
Miscellaneous.....	100 tons.....	100	5,000.00
Total.....		8,264	211,801.00
WESTBOUND.			
Cattle.....	110 head.....	28	2,800.00
Cotton.....	192 bales.....	48	11,520.00
Cotton seed.....	182 tons.....	182	7,644.00
Clams.....	2,742 bushels.....	137	2,740.00
Eggs.....	80 crates.....	2	600.00
Empty oil barrels.....	264.....	10	250.00
Fertilizer.....	870 tons.....	870	30,450.00
Fish, fresh.....	1,500 boxes.....	150	15,000.00
Fish, salt.....	1,391 barrels.....	70	7,000.00
Fish oil.....	919 barrels.....	230	19,320.00
Fertilizer fish.....	500,000.....	250	500.00
Hogs.....	110 head.....	6	1,200.00
Lime.....	360 tons.....	360	2,700.00
Oysters, canned.....	10,060 cases.....	126	12,600.00
Oysters.....	18,402 bushels.....	736	2,760.00
Poultry.....	1,511 head.....	8	600.00
Potatoes, Irish.....	1,655 bushels.....	50	1,650.00
Potatoes, sweet.....	42,219 bushels.....	1,267	38,010.00
Potatoes, sweet (canned).....	9,500 cases.....	119	9,520.00
Shells.....	19,736 bushels.....	493	996.00
Soft crabs.....	3,532 dozen.....	7	2,625.00
Watermelons.....	4,351.....	44	660.00
Total.....		5,188	171,135.00
RECAPITULATION.			
Total eastbound.....		8,264	211,801.00
Total westbound.....		5,188	171,135.00
Grand total.....		13,452	382,936.00

16. BEAUFORT INLET, N. C.

The work for the year consisted of maintaining the mean low-water channel of 20 feet depth and 300 feet width across the bar and has been carried on entirely by Government plant and hired labor, at a cost of \$16,959.30.

The U. S. seagoing hopper dredge *Cape Fear* began dredging operations on October 29, 1915, and stopped work on February 29, 1916, the project depth of 20 feet and width of 300 feet having been restored and 203,677 cubic yards of material removed, at a cost of \$15,946.49, or a unit cost of \$0.078 per cubic yard. Other expenditures were \$1,012.81 and were for district office expenses and collecting commercial statistics.

APPROPRIATIONS.

Mar. 3, 1905.....	\$45,000	Oct. 2, 1914 (allotted Oct. 7, 1914).....	\$10,000
Mar. 2, 1907.....	5,000	Mar. 4, 1915 (allotted Nov. 22, 1915).....	10,000
Mar. 3, 1909 (allotted Mar. 18, 1909).....	15,000	July 27, 1916.....	10,000
June 25, 1910.....	7,500	Total.....	122,500
July 25, 1912.....	10,000		
Mar. 4, 1913.....	10,000		

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	7	581
Barges.....	22	10,231
Gasoline.....	39	797
Total.....	68	11,609

From 200 to 250 yachts and steamers, bound to and from southern points, passed over the inlet during the year.

Eleven dunnop, deck, and derrick saws were used in carrying stone for the harbor of refuge, carrying capacity from 350 to 1,200 cubic yards.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
INBOUND.			
Acid phosphate.....	11,088 tons.....	11,088	\$88,704.00
Fish, fresh.....	17,454 boxes.....	1,745	174,500.00
Fertilizer fish.....	31,774,000.....	15,887	47,661.00
Lumber.....	18,616,000 feet b. m.....	37,232	372,320.00
Piling.....	35,000.....	8,750	70,000.00
Total.....		74,702	753,185.00
OUTBOUND.			
Cement.....	6,560 tons.....	6,560	55,760.00
Coal.....	24,424 tons.....	24,424	97,696.00
Crossties.....	3,500.....	219	1,051.20
Fertilizer material.....	1,708 tons.....	1,708	42,700.00
Gravel.....	6,065 tons.....	6,065	10,913.40
Lumber.....	10,000 feet b. m.....	20	200.00
Machinery.....	70 tons.....	70	7,000.00
Plaster.....	1,634 tons.....	1,634	19,608.00
Piling.....	130.....	33	264.00
Railroad iron.....	4,152 tons.....	4,152	124,560.00
Total.....		44,883	359,752.60
RECAPITULATION.			
Total inbound.....		74,702	753,185.00
Total outbound.....		44,883	359,752.60
Grand total.....		119,585	1,112,937.60

During the calendar year 1915, incident to the construction by the United States of the breakwater at Cape Lookout, a total of 109,640 tons of stone, valued at \$178,713, moved through this inlet, which commerce is not included in the above statement.

17. HARBOR AT MOREHEAD CITY, N. C.

The work for the year consisted of maintenance dredging with the U. S. pipe-line dredge *Croatan* and hired labor. This dredge removed, between May 1 and May 24, 1916, both inclusive, a total of 52,372.2 cubic yards of material from 3,200 linear feet of channel, at a cost of \$3,666.06, which gives a unit cost of 7 cents per cubic yard. Other expenditures were \$1,708.45 in payment for and repairs to U. S. pipe-line dredge *Croatan*, surveys, and district and field office expenses.

As a result of the year's work the project depth and width has been restored.

APPROPRIATIONS.

June 25, 1910.....	\$19,000
July 25, 1912.....	1,000
Mar. 4, 1913.....	2,000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	3,800
July 27, 1916.....	2,600
Total	28,400

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	12	806
Gasoline.....	44	541
Sailing.....	12	93
Total	68	1,440

Passengers transported during the year, about 10,000. In addition to the above about 45 yachts and steamers came in the harbor for supplies during the year.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
INBOUND.			
Cattle.....	66 head.....	17	\$1,700.00
Cottonseed hulls.....	2 tons.....	2	26.00
Clams.....	5,655 bushels.....	283	5,660.00
Eggs.....	323 crates.....	8	2,400.00
Empty oil barrels.....	18.....	1	25.00
Fish, fresh.....	40,373 boxes.....	4,037	403,700.00
Fish, salt.....	1,700 barrels.....	85	8,500.00
Furniture.....	1 ton.....	1	125.00
Gasoline.....	28 barrels.....	5	280.00
Gasoline (bulk).....	143,045 gallons.....	501	24,048.00
Grain.....	1,120 bushels.....	28	896.00
Groceries.....	515 tons.....	515	64,375.00
Hardware.....	1 ton.....	1	140.00
Hogs.....	30 head.....	2	400.00
Kerosene.....	11 barrels.....	2	60.00
Kerosene (bulk).....	43,889 gallons.....	219	4,161.00
Lumber.....	8,000 feet b. m.....	16	160.00

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
INBOUND—continued.			
Oysters.....	15,260 bushels.....	610	\$3,812.50
Poultry.....	9,800 head.....	20	4,000.00
Piles.....	50.....	13	104.00
Potatoes, sweet.....	23,547 bushels.....	706	21,180.00
Salt.....	370 sacks.....	26	208.00
Soft crabs.....	31,000 dozen.....	62	23,250.00
Soft drinks.....	162 crates.....	10	320.00
Scallops.....	15,443 gallons.....	77	12,320.00
Shingles.....	2,000.....	1	10.00
Vegetables.....	85 packages.....	4	100.00
Watermelons.....	8,600.....	86	1,290.00
Wood.....	212 cords.....	212	848.00
Total.....		7,560	584,078.50
OUTBOUND.			
Brick.....	400.....	1	3.00
Cement.....	26 tons.....	26	221.00
Coal.....	234 tons.....	234	926.00
Cotton.....	23 bales.....	6	1,440.00
Dry goods.....	17 tons.....	17	12,750.00
Fertilizer.....	71 tons.....	71	2,435.00
Furniture.....	48 tons.....	48	6,000.00
Gasoline.....	928 barrels.....	164	8,628.00
Grain.....	63 bushels.....	2	64.00
Groceries.....	186 tons.....	186	23,250.00
Hardware.....	69 tons.....	69	9,660.00
Hay.....	10 tons.....	10	240.00
Ice.....	3,821 tons.....	3,821	26,747.00
Kerosene.....	113 barrels.....	21	630.00
Lumber.....	38,800 feet b. m.....	78	780.00
Machinery.....	1 ton.....	1	100.00
Salt.....	504 sacks.....	42	326.00
Soft drinks.....	138 crates.....	9	288.00
Shingles.....	13,000.....	7	70.00
Total.....		14,813	194,528.00
RECAPITULATION.			
Total inbound.....		7,560	584,078.50
Total outbound.....		4,813	94,528.00
Grand total.....		12,363	678,606.50

¹ In addition to the above commerce, there were handled in this harbor 109,640 tons of stone for the Government breakwater, valued at \$173,713.20.

18. NEW RIVER, INCLUDING INLAND WATERWAYS BETWEEN BEAUFORT HARBOR AND NEW RIVER AND BETWEEN NEW RIVER AND SWANSBORO, N. C.

(A) NEW RIVER.

No field work was done during the year. Expenditures were \$227.10, all for improvement, and were in payment of expenses incurred in surveys, collecting commercial statistics, and office expenses.

APPROPRIATIONS.

Prior to present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 506)..... \$83,669.20

Present project:

June 25, 1910 (allotted Aug. 4, 1910).....	\$8,700.00
July 25, 1912 (allotted Aug. 31, 1912).....	500.00
Oct. 2, 1914 (allotted Oct. 26, 1914).....	1,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	500.00
	8,700.00

Total..... 92,369.20

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	3	32
Sailing.....	1	5
Gasoline.....	12	146
Total.....	15	183

Number of passengers transported during the year, 1,100.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
				<i>Miles.</i>
UPSTREAM.				
Cattle.....	50 head.....	12	\$1,300.00	22
Cement.....	4 tons.....	4	84.00	4
Cotton.....	559 bales.....	140	33,000.00	21
Cotton seed.....	105 tons.....	105	4,410.00	21
Cottonseed hulls.....	25 tons.....	25	325.00	4
Cottonseed meal.....	15 tons.....	15	465.00	4
Clams.....	696 bushels.....	35	700.00	22
Eggs.....	184 crates.....	4	1,300.00	21
Empty oil barrels.....	142.....	5	125.00	21
Fertilizer.....	90 tons.....	90	3,150.00	4
Fish, fresh.....	1,767 boxes.....	177	17,700.00	19
Fish, salt.....	1,900 barrels.....	95	9,500.00	22
Groceries.....	5 tons.....	5	625.00	4
Hardware.....	1 ton.....	1	140.00	4
Hogs.....	187 head.....	9	1,800.00	22
Oysters.....	575 bushels.....	23	227.50	22
Poultry.....	1,060 head.....	3	400.00	22
Peanuts.....	87 bushels.....	1	75.00	20
Potatoes, sweet.....	155 bushels.....	5	150.00	22
Roan.....	50 barrels.....	3	200.00	12
Salt.....	350 sacks.....	25	200.00	4
Timber.....	9,250,000 feet, b. m.....	27,750	82,350.00	10
Watermelons.....	2,500.....	25	375.00	22
Total.....		28,562	159,041.50	
DOWNSTREAM.				
Brick.....	13,500.....	34	102.00	21
Cement.....	2 tons.....	2	17.00	22
Coal.....	17 tons.....	17	66.00	22
Cotton.....	30 bales.....	8	1,920.00	4
Cotton seed.....	40 tons.....	40	1,680.00	4
Cottonseed hulls.....	65 tons.....	65	845.00	22
Cottonseed meal.....	51 tons.....	51	1,663.00	21
Dry goods.....	4 tons.....	4	3,000.00	20
Fertilizer.....	155 tons.....	155	5,425.00	21
Furniture.....	8 tons.....	8	1,000.00	22
Gasoline.....	59 barrels.....	10	520.00	21
Grain.....	2,460 bushels.....	62	1,964.00	16
Groceries.....	204 tons.....	204	25,500.00	20
Hardware.....	30 tons.....	30	4,200.00	21
Hay.....	68 tons.....	68	1,632.00	16
Ice.....	6 tons.....	6	42.00	21
Kerosene.....	219 barrels.....	40	1,200.00	20
Lumber, cedar.....	7,000 feet, b. m.....	14	420.00	4
Lumber.....	50,000 feet, b. m.....	100	1,000.00	22
Lime.....	100 barrels.....	13	119.60	22
Machinery.....	3 tons.....	3	300.00	14
Potatoes, Irish.....	25 bushels.....	1	33.00	20
Salt.....	1,191 sacks.....	63	664.00	20
Shingles.....	25,000.....	13	130.00	20
Soft drinks.....	530 crates.....	32	1,056.00	20
Timber.....	329,000 feet, b. m.....	987	2,961.00	10
Total.....		2,051	57,501.60	
RECAPITULATION.				
Total upstream.....		28,562	159,041.50	
Total downstream.....		2,051	57,501.60	
Grand total.....		30,613	216,543.10	

(B) WATERWAY BETWEEN NEW RIVER AND SWANSBORO.

The work of the year consisted of dredging with Government plant and hired labor. Between August 6, 1915, and December 2, 1915, the U. S. dredge *Scuppernong*, dredging in the Queens and Bear Creek Cut-off, removed 83,870 cubic yards of material from cuts aggregating 14,850 feet in length, 40 feet wide, and 4 feet deep, at a cost of \$6,128.57, which gives a unit cost of 7 cents per cubic yard. Other expenses were \$4,601.18 for payment for and alterations to the U. S. dredge *Croatan* and \$1,441.91 for office expenses and surveys and \$2,344.94 for special repairs to dredge *Scuppernong*.

APPROPRIATIONS.

Sept. 19, 1890.....	\$5,000.00
June 13, 1902.....	1,500.00
Mar. 2, 1907 (allotted Apr. 5, 1907).....	^a 15,000.00
Mar. 3, 1909 (allotted Mar. 22, 1909).....	^a 5,330.80
June 25, 1910 (allotted Aug. 4, 1910).....	5,000.00
Feb. 27, 1911 (allotted Mar. 3, 1911).....	^a 1,000.00
July 25, 1912 (allotted Aug. 31, 1912).....	(^a)
Mar. 4, 1913 (allotted Apr. 16, 1913).....	2,500.00
Oct. 2, 1914 (allotted Oct. 26, 1914).....	10,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	23,800.00
July 27, 1916.....	2,000.00
Total	70,130.80

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Sailing.....	5	45
Gasoline.....	18	195
Total.....	23	240

Passengers transported during the year, 450.

¹ Transferred from waterway between Beaufort Harbor and New River.

² Original allotment \$12,000, increased by \$3,000, transferred from waterway between Beaufort Harbor and New River.

³ Original allotment \$4,000, increased by \$1,330.80 transferred from New River.

⁴ Original allotment \$5,000, decreased by \$4,000 transferred to waterway between Beaufort Harbor and New River.

⁵ Original allotment \$1,000, decreased by \$1,000 transferred to waterway between Beaufort Harbor and New River.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
WESTBOUND.				<i>Miles.</i>
Brick.....	14,425.....	26	\$108.00	2
Cattle.....	40 head.....	10	1,000.00	10
Cement.....	3 tons.....	3	25.50	2
Coal.....	24 tons.....	24	96.00	2
Cotton.....	189 bales.....	47	11,280.00	10
Cotton seed.....	31 tons.....	31	1,302.00	9
Cottonseed hulls.....	51 tons.....	51	663.00	6
Cottonseed meal.....	58 tons.....	58	1,914.00	3
Clams.....	1,150 bushels.....	58	1,160.00	10
Dry goods.....	7 tons.....	7	5,250.00	2
Eggs.....	129 crates.....	3	900.00	7
Empty oil barrels.....	25.....	1	25.00	10
Fertilizer fish.....	1,600,000.....	800	1,600.00	5
Fertilizer.....	205 tons.....	205	7,175.00	11
Fish, salt.....	180 barrels.....	8	800.00	10
Furniture.....	1 ton.....	1	125.00	2
Gasoline.....	644 barrels.....	113	5,878.00	2
Grain.....	2,165 bushels.....	54	1,728.00	2
Groceries.....	145 tons.....	145	18,125.00	2
Hardware.....	21 tons.....	21	2,940.00	2
Hay.....	4 tons.....	4	96.00	2
Hogs.....	170 head.....	9	1,800.00	10
Kerosene.....	75 barrels.....	14	420.00	3
Lumber.....	551,500 feet b. m.....	1,103	11,030.00	2
Lime.....	20 barrels.....	3	27.60	2
Oysters.....	120 bushels.....	10	125.00	10
Plaster.....	12 tons.....	12	144.00	2
Poultry.....	735 head.....	1	200.00	10
Peanuts.....	80 bushels.....	1	75.00	2
Potatoes, sweet.....	130 bushels.....	4	120.00	10
Salt.....	193 sacks.....	14	112.00	2
Soft drinks.....	120 crates.....	8	256.00	2
Timber.....	100,000 feet b. m.....	300	900.00	2
Watermelons.....	2,000.....	20	300.00	10
Total.....		3,179	77,698.10	
EASTBOUND.				
Brick.....	7,000.....	18	54.00	10
Cement.....	1 ton.....	1	8.50	10
Coal.....	11 tons.....	11	44.00	10
Cotton.....	656 bales.....	164	39,360.00	3
Cotton seed.....	215 tons.....	215	9,030.00	6
Cottonseed hulls.....	48 tons.....	48	624.00	9
Cottonseed meal.....	25 tons.....	25	825.00	9
Dry goods.....	10 tons.....	10	7,500.00	10
Fertilizer.....	173 tons.....	173	6,055.00	6
Fish, fresh.....	300 boxes.....	30	3,000.00	4
Fish, salt.....	960 barrels.....	48	4,800.00	2
Fish oil.....	50 barrels.....	13	1,092.00	2
Furniture.....	5 tons.....	5	625.00	10
Gasoline.....	15 barrels.....	3	156.00	10
Grain.....	436 bushels.....	11	352.00	10
Groceries.....	9 tons.....	9	1,125.00	17
Hardware.....	15 tons.....	15	2,100.00	10
Hay.....	14 tons.....	14	336.00	10
Ice.....	1 ton.....	1	7.00	10
Kerosene.....	31 barrels.....	6	180.00	10
Lumber.....	350,000 feet b. m.....	718	7,180.00	3
Lime.....	63 barrels.....	8	73.60	10
Machinery.....	2 tons.....	2	200.00	10
Plaster.....	10 tons.....	10	120.00	2
Rosin.....	486 barrels.....	78	1,950.00	2
Salt.....	444 sacks.....	31	248.00	10
Shingles.....	4,000.....	2	20.00	10
Turpentine, spirits.....	41 barrels.....	9	900.00	2
Tar.....	12 barrels.....	2	30.00	13
Timber.....	2,718,000 feet b. m.....	8,154	24,462.00	8
Total.....		9,834	112,457.10	
RECAPITULATION.				
Westbound.....		3,179	77,698.10	
Eastbound.....		9,834	112,457.10	
Grand total.....		13,013	190,155.20	

(C) WATERWAY BETWEEN BEAUFORT HARBOR AND NEW RIVER (I. E., PORTION BETWEEN BEAUFORT AND SWANSBORO).

No work was done during the year, no plant being available. The expenditures were \$1,900 for payment for U. S. dredge *Croatan* and \$182.11 for surveys, commercial statistics, and office expenses.

APPROPRIATIONS.

Aug. 5, 1886.....	\$10, 000
Aug. 11, 1888.....	5, 000
Sept. 19, 1890.....	15, 000
July 13, 1892.....	10, 000
Aug. 18, 1894.....	2, 500
June 3, 1896.....	1, 000
June 13, 1902.....	² 9, 000
Mar. 2, 1907 (allotted Apr. 3, 1907).....	(³)
Mar. 3, 1909 (allotted Mar. 22, 1909).....	1, 000
June 25, 1910 (allotted July 29, 1910).....	12, 000
Feb. 27, 1911.....	⁴ 4, 000
July 25, 1912 (allotted Aug. 31, 1912).....	⁴ 7, 000
Mar. 4, 1913 (allotted Apr. 15, 1913).....	2, 500
Oct. 2, 1914 (allotted Oct. 28, 1914).....	5, 000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	13, 000
July 27, 1916.....	4, 000
Total	101, 000

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Gasoline.....	46	574
Sailing.....	8	56
Total	54	630

Passengers transported during the year, about 6,000.

During the year 30 to 40 yachts used this waterway. 6 flats or scows were used on this waterway.

¹ Original allotment \$9,500, reduced by \$500 transferred to waterway between New River and Swansboro.

² Original allotment \$3,000, which was transferred to waterway between New River and Swansboro.

³ Transferred from waterway between New River and Swansboro.

⁴ Original allotment \$6,000, increased by \$1,000 transferred from waterway between New River and Swansboro.

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Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
EASTBOUND.				<i>Miles.</i>
Cattle.....	10 head.....	3	\$300.00	20
Cotton.....	1,115 bales.....	279	66,960.00	27
Cotton seed.....	724 tons.....	724	30,408.00	28
Clams.....	2,322 bushels.....	116	2,320.00	20
Eggs.....	95 crates.....	2	600.00	28
Empty oil barrels.....	333.....	12	300.00	28
Fertilizer.....	78 tons.....	78	2,730.00	8
Fish, fresh.....	8,232 boxes.....	823	82,300.00	25
Fish, salt.....	1,261 barrels.....	63	6,300.00	28
Fish oil.....	204 barrels.....	51	4,284.00	14
Fertilizer fish.....	576,000.....	288	576.00	5
Furniture.....	12 tons.....	12	1,500.00	28
Hogs.....	63 head.....	3	600.00	28
Lumber.....	7,049,000 feet b. m.....	14,096	140,960.00	25
Oysters.....	100 bushels.....	4	50.00	20
Poultry.....	1,620 head.....	3	600.00	20
Rosin.....	1,038 barrels.....	166	4,150.40	28
Soft crabs.....	3,000 dozen.....	6	2,260.00	10
Timber.....	3,867,000 feet b. m.....	11,601	34,803.00	20
Turpentine, spirits.....	46 barrels.....	10	1,000.00	28
Watermelons.....	37,000.....	370	5,550.00	18
Wood.....	53 cords.....	68	212.00	25
Total.....		26,763	388,753.00	
WESTBOUND.				
Brick.....	79,000.....	198	594.00	26
Cement.....	16 tons.....	16	126.00	26
Coal.....	92 tons.....	92	368.00	26
Cottonseed hulls.....	65 tons.....	65	845.00	24
Cottonseed meal.....	136 tons.....	136	4,488.00	26
Dry goods.....	29 tons.....	29	21,750.00	26
Fertilizer fish.....	17,801,000.....	8,900	17,800.00	5
Fertilizer.....	590 tons.....	590	20,650.00	27
Furniture.....	11 tons.....	11	1,375.00	26
Gasoline.....	756 barrels.....	132	8,864.00	26
Grain.....	10,709 bushels.....	268	8,578.00	26
Groceries.....	496 tons.....	496	60,750.00	26
Hardware.....	140 tons.....	140	19,600.00	26
Hay.....	82 tons.....	82	1,988.00	26
Ice.....	67 tons.....	67	499.00	26
Kerosene.....	261 barrels.....	48	1,440.00	27
Lumber.....	52,000 feet b. m.....	104	1,040.00	20
Lime.....	89 barrels.....	11	101.20	27
Machinery.....	18 tons.....	18	1,800.00	26
Potatoes, Irish.....	135 bushels.....	4	132.00	26
Plaster.....	22 tons.....	22	264.00	26
Salt.....	1,715 sacks.....	120	960.00	26
Soft drinks.....	1,037 crates.....	65	2,060.00	27
Shingles.....	106,000.....	68	530.00	26
Total.....		11,567	174,380.20	
RECAPITULATION.				
Total eastbound.....		26,763	388,753.00	
Total westbound.....		11,567	174,380.20	
		40,330	563,133.20	

19. CAPE FEAR RIVER, N. C., AT AND BELOW WILMINGTON.

The work of the year has consisted of dredging for the purpose of maintaining the 26-foot mean low water channel in the river and across the ocean bar and increasing the depth in the anchorage basin at Wilmington to 26 feet. The work was carried on entirely by Government plant and hired labor, at a cost of \$142,654.55.

The work performed by each dredge and the location and cost of the same is given in the following table:

Name of dredge.	Time worked, months.	Material removed.				Cost, including all expenses.	
		Ocean bar (cubic yards).	River channels and anchorage basin.				
			Cubic yards.	Stumps.	Logs.	Total.	Per cubic yard.
Cape Fear.....	6	181,485	207,737	.....	\$25,864.06	6.6	
Henry Bacon.....	8	.....	821,513	.....	78,019.38	9.5	
Hercules.....	4½	.....	239,674	569	161	13,125.74	5.5
Total.....	.....	181,485	1,268,924	569	161	117,009.18	8.1

The cost of making special repairs to the dredge *Cape Fear*, \$23,567.94, and the cost of a new steel warehouse built at the Wilmington yard, \$2,077.43, are not included in the cost of the dredging but have been added to the value of plant. The cost of removing logs and stumps is included in the cost per cubic yard.

The estimated value of dredging plant belonging to this improvement at the beginning of the year was \$253,521.45, and during the year special repairs made to the dredge *Cape Fear* and constructing new warehouse, cost \$25,645.37, making the value of this plant \$279,166.82. Adding 10 per cent of this value \$27,916.68, to the cost of the year's dredging for deterioration, makes the cost, including deterioration, 10 cents per cubic yard.

As a result of the year's work the anchorage basin at Wilmington has been increased in depth from 24 to 26 feet. The ocean-bar channel has been maintained and has a project depth of 26 feet for a width of from 280 to 400 feet, the same as at the beginning of the year. The work on the river channels has been confined to maintenance and consisted of restoring portions of Lilliput, Old Brunswick Cove, Midnight, and lower Snows Marsh Channels, where shoaling had taken place, to project depths. Project depth now exists in all of the river channels excepting the upper reach of Snows Marsh Channel, where the available low-water depth is about 23 feet. New Inlet and Swash Defense Dams and their extensions remain in good condition, no repairs being necessary during the year.

The project is about 83 per cent completed.

APPROPRIATIONS.

Prior to present project (H. Doc. No. 1491, 63d Cong., 3d sess., p. 420).....	\$5,228,228.92
Present project:	
July 25, 1912.....	\$300,000.00
Mar. 4, 1913.....	352,940.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	115,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	150,000.00
July 27, 1916.....	185,000.00
	<hr/> 1,052,940.00
Total	<hr/> 6,281,168.92

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessels of 100 tons and over at the port of Wilmington, N. C., for calendar year ending Dec. 31, 1915.

Classes.	Ameri- can.	Foreign.	Total.	Net regis- tered tonnage.
Registered:				
Steamers.....	17	44	61	114,942
Sailing.....	15	2	17	8,647
Barges.....	14	.....	14	10,887
Total.....	46	46	92	134,476

The above does not include vessels coming to Southport in distress for supplies or for harbor. Neither does it include vessels owned by the United States.

In addition to the above statement, the following vessels are operated regularly on the Cape Fear River:

Classes.	Number.	Net regis- tered tonnage.
Registered:		
Steamers.....	27	8,419
Sailing.....	17	234
Gasoline.....	10	78
Total.....	54	8,731

Passengers transported during the year, about 30,000.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
EXPORTS.				
FOREIGN, DOWNSTREAM.				
Cotton.....	289,511 bales.....	72,274	\$18,150,300.00	<i>Miles.</i> 30
Cottonseed oil cake.....	12,020 tons.....	12,020	307,950.00	30
Pig iron.....	902 tons.....	902	18,268.00	30
Total.....	.....	85,256	18,471,518.00	.....
IMPORTS.				
FOREIGN, UPSTREAM.				
Fertilizer material.....	63,310 tons.....	63,310	1,582,750.00	30
Molasses.....	254,382 gallons.....	1,081	76,670.00	30
Miscellaneous.....	3 tons.....	3	840.00	30
Salt.....	498 tons.....	498	3,984.00	30
Total.....	.....	64,892	1,663,244.00	.....
COASTWISE.				
Bagging.....	915 tons.....	915	61,671.00	30
Cement.....	6,125 tons.....	6,125	52,062.50	30
Coal.....	5,246 tons.....	5,246	20,984.00	30
Clams.....	6,642 bushels.....	332	6,640.00	30
Crostities.....	80,081.....	5,005	24,024.00	30
Cotton.....	25,457 bales.....	6,364	1,527,360.00	30
Cotton seed.....	847 tons.....	847	85,574.00	30
Dry goods.....	4,408 tons.....	4,408	3,306,000.00	30
Eggs.....	1,852 crates.....	46	18,900.00	30
Empty oil barrels.....	2,187.....	52	2,050.00	30
Furniture.....	613 tons.....	513	64,126.00	30

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
IMPORTS—Continued.				
COASTWISE—continued.				
				<i>Miles.</i>
Fertilizer fish	52,000,000.....	26,000	\$78,000.00	11
Fertilizer material	4,035 tons.....	4,035	100,875.00	30
Fish, salt	5,612 barrels.....	281	28,100.00	30
Fertilizer	2,552 tons.....	2,552	89,320.00	30
Gasoline	4,570,778 gallons.....	15,968	685,514.30	30
Grain	129,746 bushels.....	3,244	103,808.00	30
Groceries	36,116 tons.....	36,116	4,514,500.00	30
Hardware	12,709 tons.....	12,709	1,779,270.00	30
Hogs	238 head.....	12	2,400.00	30
Kerosene	5,603,050 gallons.....	28,015	476,255.00	30
Lumber	30,500,000 feet b. m.....	61,000	610,000.00	30
Miscellaneous	3,673 tons.....	3,673	367,300.00	30
Machinery	9 tons.....	9	900.00	30
Matches	836 tons.....	836	132,000.00	30
Potatoes, sweet	3,899 bushels.....	117	3,510.00	30
Potatoes, Irish	3,679 bushels.....	110	3,630.00	30
Phosphate rock	17,534 tons.....	17,534	87,670.00	30
Plaster	355 tons.....	355	4,260.00	30
Peanuts	9,980 bushels.....	140	10,500.00	30
Poultry	10,633 head.....	21	4,200.00	30
Pine straw	663 tons.....	663	4,158.00	30
Rosin	10,154 barrels.....	1,625	40,625.00	30
Shingles	2,019,550.....	1,010	10,100.00	30
Salt	3,983 tons.....	3,983	31,864.00	30
Tar	2,598 barrels.....	390	5,860.00	30
Turpentine, spirits	2,116 barrels.....	476	47,600.00	30
Turpentine, crude	70 barrels.....	11	220.00	30
Vegetables	5,155 packages.....	258	6,450.00	30
Total.....		251,088	14,343,159.80	-----
EXPORTS.				
COASTWISE.				
Brick	152,900.....	382	1,146.00	30
Cement	257 tons.....	257	2,184.50	30
Cotton	18,570 bales.....	4,642	1,114,080.00	30
Cottonseed hulls	7 tons.....	7	91.00	30
Cottonseed meal	314 tons.....	314	10,362.00	30
Clams	1,215 bushels.....	61	1,220.00	30
Crostities	83,341.....	5,209	25,003.20	30
Deer tongue	226 tons.....	226	22,600.00	30
Dry goods	2,857 tons.....	2,857	2,142,750.00	30
Eggs	1,406 crates.....	35	10,500.00	30
Fertilizer	9,941 tons.....	9,941	347,935.00	30
Fertilizer material	360 tons.....	360	9,000.00	30
Fish oil	3,401 barrels.....	850	71,400.00	30
Furniture	149 tons.....	149	18,625.00	30
Grain	143,913 bushels.....	3,598	115,136.00	30
Groceries	20,208 tons.....	20,208	2,526,000.00	30
Gasoline	1,032 barrels.....	181	9,412.00	30
Headings	102,218 bundles.....	3,578	81,757.30	30
Hardware	10,344 tons.....	10,344	1,448,160.00	30
Hay	312 tons.....	312	7,488.00	30
Ice	90 tons.....	90	630.00	30
Kerosene	387 barrels.....	71	2,130.00	30
Lime	278 barrels.....	35	322.00	30
Lumber	50,962,000 feet b. m.....	101,924	1,019,240.00	30
Machinery	182 tons.....	182	18,200.00	30
Miscellaneous	1,877 tons.....	1,877	187,700.00	30
Peanuts	1,869 bushels.....	26	1,860.00	30
Potatoes, Irish	712 bushels.....	21	693.00	30
Pine straw	663 tons.....	663	4,158.00	30
Rosin	18,096 barrels.....	2,895	72,375.00	30
Salt	1,115 tons.....	1,115	8,920.00	30
Shingles	4,385,950.....	2,193	21,930.00	30
Soft drinks	659 crates.....	41	1,312.00	30
Staves	360,000.....	180	2,880.00	30
Tar	10,361 barrels.....	1,564	23,810.00	30
Turpentine, spirits	1,246 barrels.....	280	28,000.00	30
Turpentine, crude	7,372 barrels.....	1,106	22,120.00	30
Vases	10,737,734 square feet.....	1,139	31,104.14	30
Vegetables	150 packages.....	8	200.00	30
Total.....		178,941	9,412,024.14	-----

CAPE FEAR RIVER BELOW WILMINGTON, N. C.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
INTERNAL, UPSTREAM.					
				Miles.	
Cattle.....	205 head.....	51	\$5,100.00	19	\$0.171
Cotton.....	315 bales.....	79	18,960.00	12	.167
Cotton seed.....	41 tons.....	41	1,722.00	17	.059
Clams.....	760 bushels.....	38	760.00	26	.058
Eggs.....	207 crates.....	5	1,500.00	23	.273
Empty oil barrels.....	556.....	21	526.00	24	.11
Fertilizer.....	1,900 tons.....	1,900	66,500.00	25	(¹)
Fish, fresh.....	1,289 boxes.....	129	12,900.00	18	(¹)
Fish, salt.....	684 barrels.....	34	3,400.00	25	(¹)
Fish oil.....	5,812 barrels.....	1,453	122,062.00	18	(¹)
Hogs.....	645 head.....	32	6,400.00	26	.14
Lumber.....	500,000 feet b. m.....	1,000	10,000.00	12	(¹)
Peanuts.....	7,600 bushels.....	106	7,960.00	13	.236
Potatoes, Irish.....	2,140 bushels.....	64	2,112.00	16	.125
Potatoes, sweet.....	3,375 bushels.....	101	3,030.00	17	.118
Poultry.....	1,800 head.....	3	600.00	12	.81
Rosin.....	3,508 barrels.....	561	14,025.00	14	(¹)
Shrimp.....	5,300 bushels.....	212	5,300.00	3	(¹)
Turpentine, spirits.....	622 barrels.....	140	14,000.00	14	(¹)
Turpentine, crude.....	530 barrels.....	80	1,600.00	12	(¹)
Tar.....	605 barrels.....	91	1,365.00	12	(¹)
Timber.....	761,000 feet b. m.....	2,263	6,849.00	12	(¹)
Vegetables.....	699 packages.....	35	875.00	26	.08
Watermelons.....	11,080.....	111	1,665.00	17	(¹)
Wood.....	1,300 cords.....	1,300	5,300.00	12	(¹)
Total.....		9,870	314,390.00		
INTERNAL, DOWNSTREAM.					
Brick.....	27,100.....	68	204.00	18	(¹)
Cement.....	151 tons.....	151	1,283.50	24	.063
Coal.....	6,614 tons.....	6,614	26,456.00	15	(¹)
Cottonseed hulls.....	77 tons.....	77	1,001.00	24	.071
Cottonseed meal.....	143 tons.....	143	4,719.00	23	.091
Dry goods.....	145 tons.....	145	108,750.00	25	.16
Empty oil barrels.....	6,733.....	262	6,300.00	25	(¹)
Fertilizer.....	229 tons.....	229	8,015.00	16	.063
Furniture.....	208 tons.....	208	26,000.00	25	.16
Grain.....	115,947 bushels.....	2,899	92,798.00	24	.083
Groceries.....	667 tons.....	667	83,375.00	25	.16
Hardware.....	292 tons.....	292	40,880.00	24	.075
Hay.....	433 tons.....	433	10,392.00	23	.087
Horses.....	16 head.....	8	1,600.00	25	.16
Ice.....	366 tons.....	366	2,562.00	25	.04
Kerosene.....	1,333 barrels.....	243	7,290.00	24	.10
Lumber.....	273,000 feet b. m.....	546	5,460.00	23	(¹)
Lime.....	729 barrels.....	91	837.20	20	.08
Potatoes, sweet.....	755 bushels.....	23	690.00	25	.066
Potatoes, Irish.....	350 bushels.....	11	363.00	25	.066
Salt.....	7,317 sacks.....	366	2,928.00	24	.083
Soft drinks.....	2,525 crates.....	158	5,066.00	25	.16
Shingles.....	73,000.....	37	370.00	23	.065
Stone.....	78 tons.....	78	117.00	25	(¹)
Total.....		14,106	437,416.70		

¹ Carried by owners.² Cargo.

Commerce passing over Wilmington Harbor to and from rivers above.

Commodities.	Amount in customary units.	Amount in short tons.	Value.
INBOUND.			
Basket bottoms.....	2,000,000.	1,000	\$17,400.00
Cattle.....	1,664 head.....	416	41,600.00
Cotton.....	7,783 bales.....	1,946	467,040.00
Cotton seed.....	2,584 tons.....	2,584	108,528.00
Eggs.....	6,451 crates.....	161	48,300.00
Empty oil barrels.....	1,479.....	55	1,375.00
Grain.....	3,288 bushels.....	82	2,624.00
Horses.....	13 head.....	7	1,400.00
Hogs.....	2,296 head.....	115	23,000.00
Hay.....	175 tons.....	175	4,200.00
Lumber.....	13,021,000 feet b. m.....	26,042	260,420.00
Machinery.....	5 tons.....	5	500.00
Miscellaneous.....	64 tons.....	64	3,200.00
Poultry.....	48,246 head.....	96	19,200.00
Potatoes, sweet.....	4,183 bushels.....	125	3,750.00
Potatoes, Irish.....	1,000 bushels.....	30	990.00
Peanuts.....	40,125 bushels.....	562	42,150.00
Rosin.....	3,975 barrels.....	696	15,900.00
Shingles.....	4,830,000.....	2,415	24,150.00
Turpentine, spirits.....	1,377 barrels.....	310	31,000.00
Turpentine, crude.....	3,027 barrels.....	454	9,080.00
Tar.....	6,583 barrels.....	987	14,805.00
Timber.....	14,701,000 feet b. m.....	44,103	132,309.00
Vegetables.....	300 packages.....	15	375.00
Watermelons.....	8,440.....	84	1,260.00
Wood.....	4,270 cords.....	4,270	17,080.00
Total.....		86,739	1,291,636.00
OUTBOUND.			
Brick.....	170,800.....	427	1,281.00
Cement.....	587 tons.....	587	4,989.50
Coal.....	778 tons.....	778	3,112.00
Cotton seed.....	44 tons.....	44	1,848.00
Cottonseed hulls.....	209 tons.....	209	2,717.00
Cottonseed meal.....	633 tons.....	633	20,889.00
Dry goods.....	124 tons.....	124	98,000.00
Fertilizer.....	4,809 tons.....	4,809	168,315.00
Fish, salt.....	772 barrels.....	39	3,900.00
Fish, fresh.....	20 boxes.....	2	200.00
Furniture.....	26 tons.....	26	3,250.00
Gasoline.....	438 barrels.....	77	4,074.00
Grain.....	71,095 bushels.....	1,777	56,864.00
Groceries.....	1,547 tons.....	1,547	193,375.00
Hardware.....	301 tons.....	301	42,140.00
Hay.....	705 tons.....	705	16,920.00
Horses.....	54 head.....	27	5,400.00
Ice.....	507 tons.....	507	3,549.00
Kerosene.....	1,792 barrels.....	327	9,810.00
Lumber.....	822,000 feet b. m.....	1,644	16,440.00
Lime.....	1,493 barrels.....	187	1,720.40
Machinery.....	256 tons.....	256	26,600.00
Miscellaneous.....	95 tons.....	95	4,750.00
Potatoes, Irish.....	1,265 bushels.....	38	1,254.00
Stone.....	1,056 tons.....	1,056	1,584.00
Salt.....	7,837 sacks.....	392	3,136.00
Soft drinks.....	4,065 crates.....	292	9,344.00
Shingles.....	53,000.....	27	270.00
Timber.....	581,000 feet b. m.....	1,743	5,229.00
Vegetables.....	100 packages.....	5	125.00
Total.....		18,681	705,015.90
RECAPITULATION.			
Exports:			
Foreign.....		85,256	13,471,518.00
Coastwise.....		178,941	9,412,024.14
Imports:			
Foreign.....		64,892	1,663,244.00
Coastwise.....		251,086	14,343,159.80
Internal:			
Upstream.....		9,870	314,390.00
Downstream.....		14,106	437,416.70
Wilmington Harbor:			
Inbound.....		86,739	1,291,636.00
Outbound.....		18,681	705,015.90
Grand total.....		709,570	46,638,404.54

Cotton steamers loaded at the port of Wilmington, N. C., during the calendar year 1915.

Name of steamer.	Tonnage.	Draft loaded.	Number of bales.
City of Savannah.....	4,379	Ft. in. 21 6	9,529
City of Columbus.....	4,111	22 0	10,000
Edernian.....	2,284	17 8	12,823
Ellin (part cargo).....	2,780	19 9	5,550
Felham (part cargo).....	2,260	19 6	2,990
Ben Nevis.....	2,525	19 4	13,119
City of Savannah.....	4,379	21 0	10,300
Baldo (part cargo).....	2,044	15 7	6,000
Ancheoblae.....	2,500	19 3	13,111
Alcana.....	2,246	18 5	12,278
Citta di Messina.....	1,557	16 1	6,840
City of Memphis.....	3,931	21 6	10,460
Narcis (part cargo).....	2,614	20 0	3,800
Castleton.....	1,540	17 7	6,874
Georgiana (part cargo).....	2,847	15 0	3,000
City of Savannah.....	4,379	21 6	10,653
Everest.....	1,332	15 7	6,809
Alcana.....	2,246	18 11	12,641
Citta di Messina.....	1,557	16 4	6,696
Vigilancia (part cargo).....	2,934	21 9	6,000
Citta di Messina.....	1,557	15 7	6,726
Sowwell.....	2,430	20 9	13,070
Helredale.....	2,253	18 2	13,931
Cayo Gitano.....	1,983	21 0	10,767
Southgate.....	2,378	20 10	12,679
Gretaston.....	2,178	20 0	11,604
Blair Hall.....	1,624	17 4	8,694
Tuddal.....	2,219	18 7½	11,571
Hastingsden.....	1,220	16 3	6,005
Alcana.....	2,246	19 5	13,066
Elisston.....	1,843	18 7	12,025
Total.....	76,376	.....	280,511

20. CAPE FEAR RIVER, N. C., ABOVE WILMINGTON (LOCKS AND DAMS).

Work during the year was carried on by Government plant and hired labor at Kings Bluff, at Browns Landing, and on various river shoals between Kings Bluff and Browns Landing.

LOCK AND DAM NO. 1, AT KINGS BLUFF, N. C.

Lock.—On July 1, 1915, the lock was completed, with the exception of the concrete covering for the wing walls and the back filling behind the land wall. During the fiscal year the concrete protection of the wing walls was completed, 54 cubic yards of concrete having been deposited. On July 12, 1915, the lock gates were closed and the lock was put in operation. A sheet-pile retaining bulkhead 100 feet long was put in on the land side of the upper entrance to the lock. A dike 6 feet high, connecting the upper wing wall with the high ground, was completed. Nine hundred and seventy-seven cubic yards of fill and 200 tons of riprap were used. A ditch was dug parallel to this dike to drain the swamp. Thirty-four cubic yards of back filling were deposited below the upper wing wall. All of the remaining steel piling in the cofferdam was pulled except 37 piles, which were burned off with an oxyacetylene torch. One hundred and thirty cubic yards of grading was done and 44 tons of riprap placed on the graded slope below the lock. The 33 remaining wooden anchor piles of the cofferdam were removed.

Abutment.—On July 1, 1915, the abutment was completed, excepting some grading and riprapping. During the fiscal year 320 cubic

yards of earth fill and 135 tons of riprap were placed on the bank above the abutment and 20 cubic yards of grading and 425 tons of riprap on the bank below the abutment. There was also a small additional amount of grading and riprapping done at the toe of the latter slope.

Dam.—On July 1, 1915, the dam was completed, except some riprap fill and placing of the covering on crib 3. During the year 401 tons of riprap were placed in the cribs, the longitudinal timbers of crib 3 were put in place, and the covering of the dam completed. Three hundred and twenty-one steel protecting bars were put in place on top of the dam and 10,091 cubic yards of clay were deposited on the upper side of the dam by the dredge *Ajax* and derrick boats. The dam was completed July 12, 1915. During the year eight small leaks through the upper cut-off wall developed. These were variously stopped by the use of Wakefield piling, sand bags, brush, clay, and gravel. The fill against the upper face of the dam was renewed three times and 525 tons of riprap were placed below the dam at points where scouring had occurred.

Following are the expenditures for the above work at Kings Bluff:

IMPROVEMENT.

Lock:

Removal of portion of cofferdam.....	\$1,325.02
Back filling, 34 cubic yards, at \$1.92.....	65.30
Shore revetment, riprap, 44 tons, at \$1.37.....	60.29
Lock gates, completion, coffering, closing, etc.....	143.17
Telephone.....	4.00
Piling bulkhead, 100 feet, at \$6.22.....	622.80
Miscellaneous, engineering, contingencies.....	1,695.09
Total.....	3,915.67

Abutment:

Clay fill, 340 cubic yards, at 58 cents.....	198.96
Shore revetment, riprap in place, 560 tons, at \$2.50.....	1,400.00
Total.....	1,598.96

Dam:

Wakefield piling, 6 piles, at \$4.01.....	24.08
Driving 16 round piles, at \$5.65.....	90.44
Timber in dam, completion of covering.....	1,087.03
Riprap in dam, 401 tons, at \$1.72.....	689.66
Clay fill, 10,091 cubic yards, at 23 cents.....	2,395.70
Steel protection installation.....	253.84
Miscellaneous, engineering, contingencies.....	3,195.99
Total.....	7,736.74

Total for lock, abutment, and dam for improvement..... 13,251.37

MAINTENANCE.

Lock:

Shore revetment, riprap in place, 47 cubic yards, at \$2.69.....	\$126.56
Lock tender's dwellings, painting, etc.....	29.00
Wakefield piling.....	33.16
Miscellaneous, engineering, contingencies, including all items not otherwise provided for.....	907.80
Operating lock gates, pay of lock tenders.....	1,161.20
Main office expenses.....	504.02
Total for lock.....	2,761.74

Dam:

Repairing top of dam, 159 linear feet, at \$7.08 per foot.....	\$1, 127. 09
Riprap below dam, 232 tons, at 50 cents per ton.....	117. 81
Renewing fill above dam, 46,353 cubic yards, at 28 cents per yard..	1, 206. 22
Miscellaneous, engineering, contingencies, including items not otherwise provided for	2, 287. 14
Total for dam.....	4, 738. 26
Total for lock and dam for maintenance.....	7, 500. 00
Total for improvement and maintenance.....	20, 751. 37

LOCK AND DAM NO. 2, AT BROWNS LANDING, N. C.

Plant and equipment.—On July 1, 1915, labor quarters had been erected, also some plant buildings, and a small amount of plant installed. During the fiscal year, a concrete mixing plant, with a delivery track from the cement house to the mixer, was erected. A general storage house, a shed for storing rope, two gravel bins, with a combined capacity of about 3,200 tons, and a sand bin of about 1,000 tons capacity, and a wharf were built. Two 100-horsepower boilers, an air compressor, and an electric-light plant were installed. Three stiff-leg derricks and one small guy derrick were erected. All of the equipment used at Kings Bluff was received at Browns Landing.

Lock.—On July 1, 1915, the driving of steel piling for the cofferdam was 92.4 per cent completed, and the excavation inside of the cofferdam was 23.6 per cent completed. During the year, the cofferdam was completed by the driving of 162 steel piles and the filling of two pockets. A 24-inch floodgate was installed. The dredging inside of the cofferdam was completed by the removal of about 18,000 cubic yards of material. Driving piles for the lock foundation was completed, 2,515 piles having been driven. Nineteen pile-pulling tests to determine the resistance of the piles to upward pressure, were made with satisfactory results. Depositing concrete in the lock floor by means of a tremie, in an average depth of water of 20 feet, was started January 27, and completed February 27; 3,849.6 cubic yards were deposited, the floor being from 4 to 5 feet thick. This method of construction was made necessary by the extremely pervious nature of the river bottom. The cofferdam was first pumped out April 4. Thirty cubic yards of concrete were deposited in the foot walls for supporting the wall forms. On April 26 the erection of the lock walls was commenced. During the year 6,811.8 cubic yards of concrete were deposited, the walls being 59.1 per cent completed on June 30, 1916. A traveling derrick was installed in the lock pit, for handling wall forms. All of the lock-gate material was received from the contractor, and the bearing plates and the quoin castings were set in place. The first field coat of paint, before the erection of the gates, was 99 per cent completed. On September 14, a serious movement of the upstream pockets on the land side of the lock cofferdam occurred, the pockets showing a tendency to turn over toward the lock pit. The pockets were anchored by steel cable to tree anchorages, the earth behind the pockets was removed to a depth of about 15 feet, and a drain was put in behind the cofferdam, discharging through the wall into the lock pit. There has been very little subsequent movement of the pockets. As a protection

against scour, 2,718 cubic yards of sand and 75 tons of riprap were placed outside of the upper end of the cofferdam, and riprap was placed on top of the upstream pockets. The snag boat *General H. G. Wright* dredged from the river at Browns Landing 6,253 cubic yards of sand for concrete.

Abutment.—On July 1, 1915, the excavation for the abutment was 85 per cent completed. During the year the excavation was completed by the removal of 302 cubic yards of material. Driving of foundation piles for the abutment was completed, 196 piles having been driven during the year. The cofferdam was completed by the driving of 276 steel piles. On August 11 a landslide occurred back of the abutment site, which necessitated a considerable amount of dredging, grading, and riprapping, the replacing of 34 badly bent steel piles, and the driving of a bulkhead of 110 pine piles behind the cofferdam at the foot of the original slope. The back wall of the cofferdam was tied to this bulkhead. In February another landslide occurred, requiring more grading and riprapping. About 300 tons of riprap have been used for the protection of the abutment. The abutment foundation was completed. There was deposited with a tremie 596.8 cubic yards of concrete, the concrete being deposited under water. Preparations were made for pumping out the cofferdam and building the abutment walls.

Dam.—The contract has been let for furnishing riprap and capstones for the dam.

RIVER SHOALS.

All of the dredging below Kings Bluff is completed with the exception of the rock shoal at Pridgens Landing, which is about 75 per cent completed. Between Kings Bluff and Browns Landing the dredging is 98.2 per cent completed. From these shoals 194,671 cubic yards of sand and mud and 2,163 logs and trees were removed by the dredge *Ajax*. The *Ajax* also removed 300 piles from an old jetty above Cypress Landing, 100 piles from jetties at Walkers Bluff, and 100 piles from a jetty below Little Sugar Loaf Landing. These jetties were a menace to navigation. Sixty sets of ranges were erected, marking the dredged channel between Walkers Bluff and Browns Landing, and seven permanent bench marks were established for use in connection with the surveying of the shoals.

Following are the expenditures during the year for the above work:

Lock at Browns Landing:

Surveying, gauge reading, and engineering	\$66.35
Main office expenses	24.72
Equipment, including camps, floating plant, and machinery	13,186.06
Equipment, tools, instruments, etc.	254.77
Excavation and dredging lock and approaches, 18,000 cubic yards, scow measurement, at 55 cents	9,963.41
Cofferdam, completion of closure, filling pockets, etc.	7,972.56
Piles in foundation, 2,515, at \$5.09	12,815.68
Concrete in foundation, 3,849.6 cubic yards, at \$6.91	26,695.45
Concrete in footings, 30 cubic yards, at \$4.88	149.56
Concrete in walls, 6,811.8 cubic yards, at \$3.58	58,715.88
Shore revetment, riprap, miscellaneous expenditures	126.34
Timber in guard and miter sills, 3,024 feet, board measure, at \$40 per M	120.96
Two sets of mitring gates, with operating gear	11,028.12
Two lock tenders' houses, miscellaneous	18.00

Lock at Browns Landing—Continued.

Miscellaneous, engineering, contingencies, including items not otherwise provided for-----	\$13,886.62
On hand at the end of the year, in addition to the above—	
Cement-----	5,942.12
Gravel-----	3,697.16
Total -----	164,161.76

Abutment at Browns Landing:

Steel piling, 181.9 tons, at \$2.41-----	439.50
196 foundation piles, at \$4.69-----	919.24
Excavation and dredging, 302 cubic yards, at \$2.09-----	633.65
Concrete in floor, 596.8 cubic yards, at \$6.90-----	4,122.93
Concrete in footings, for supplies and equipment-----	11.03
Concrete in walls, for supplies and equipment-----	1,331.48
Miscellaneous, engineering, contingencies, including items not otherwise provided for-----	3,603.27
Main office expenses-----	1,053.52
	12,114.62

Dam at Browns Landing:

Riprap in dam and at toe of dam, miscellaneous-----	57.28
Miscellaneous, engineering, contingencies, including items not otherwise provided for-----	6.68
Main office expenses-----	1,800.00
Total -----	1,863.96

Total for lock, abutment, and dam----- 178,140.34

River shoals: 194,671 cubic yards of sand and mud, scow measurement, including removal of snags and logs, at 9 cents per yard---- 19,179.82

Grand total for the year----- **197,820.16**

APPROPRIATIONS.

Prior to present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 42)-----	\$50,000.00
Present project:	
June 25, 1910-----	\$100,000.00
Mar. 4, 1911-----	200,000.00
June 23, 1913-----	315,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	70,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	173,000.00
Mar. 4, 1915 (allotted Dec. 24, 1915)-----	98,000.00
July 27, 1916-----	83,000.00
	1,089,000.00
Total -----	1,089,000.00
Returned to surplus fund of Treasury, act of Mar. 4, 1909-----	35,317.77
Net total -----	1,053,682.23

CONTRACTS IN FORCE.

Name of contractor: Virginia & Carolina Southern Railroad Co., Lumberton, N. C.

Date of contract: May 14, 1914.

Date of approval: May 20, 1914.

Date fixed for commencement: July 1, 1914.

Date fixed for completion: September 1, 1917.

For construction of spur railroad track from Elizabethtown, N. C., to lock site at Browns Landing, and for transportation of material.

Completed to June 30, 1916: 89.7 per cent.

Name of contractor: N. A. Regan, Elizabethtown, N. C.

Date of contract: January 14, 1915.

Date of approval: February 4, 1915.

Date fixed for commencement: March 28, 1915.

Date fixed for completion: August 8, 1915.

For furnishing and delivering about 2,716 short-leaf pine pilings at 6 cents per linear foot.

Completed to January 30, 1916: 100 per cent.

Name of contractor: Virginia Sand & Gravel Corporation, Norfolk, Va.

Date of contract: June 28, 1915.

Date of approval: July 2, 1915.

Date fixed for commencement: September 15, 1915.

Date fixed for completion: March 15, 1917.

For furnishing and delivering about 19,700 tons of gravel at \$1.98, \$2, and \$2.50 per ton.

Completed to June 30, 1916: 68 per cent.

Name of contractor: Alpha Portland Cement Co., Easton, Pa.

Date of contract: July 31, 1915.

Date of approval: August 10, 1915.

Date fixed for commencement: October 1, 1915.

Date fixed for completion: April 1, 1917.

For furnishing and delivering about 22,000 barrels of Portland cement, at \$1.49 per barrel.

Completed to June 30, 1916: 88 per cent.

Name of contractor: Riter-Conley Manufacturing Co., Pittsburgh, Pa.

Date of contract: August 11, 1915.

Date of approval: August 24, 1915.

Date fixed for commencement: October 1, 1915.

Date fixed for completion: March 1, 1916.

For furnishing and delivering two pairs of steel lock gates, with accessories, for \$9,460.

Completed to June 30, 1916: 100 per cent.

Name of contractor: Raleigh Granite Co., Raleigh, N. C.

Date of contract: May 25, 1916.

Date of approval: June 5, 1916.

Date fixed for commencement: July 1, 1916.

Date fixed for completion: January 1, 1918.

For furnishing and delivering about 14,800 tons of riprap stone, and about 1,500 tons of capstones, at \$1.78 per ton.

Completed to June 30, 1916: None.

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year on a draft of 4 feet to the forty-seventh milepost until July 18, 1915, at which time Lock No. 1 was put in operation; after that navigable on draft of 4 feet the remainder of the year to the eighty-fourth milepost; the upper 31 miles is not navigable during low-water stages, which prevail from two to four months each summer.

Vessel classification.

Classes.	American.	Foreign.	Total.	Net registered tonnage.
Steamships.....		4	4	6,193
Steamers.....	10		10	416
Gasoline.....	6		6	42
Barges.....	3		3	1,222
Total.....	19	4	23	7,873

Fifteen to twenty flats are operated irregularly on the river.

Number of passengers transported during the year, about 2,500.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
DOWNSTREAM.					
				<i>Miles.</i>	
Basket bottoms.....	2,000,000.	1,000	\$17,400.00	14	(¹)
Cattle.....	1,246 head.	311	31,100.00	59	30.098
Cotton.....	5,301 bales.	1,325	315,000.00	102	.029
Cotton seed.....	1,732 tons.	1,732	72,744.00	72	.028
Eggs.....	5,215 crates.	180	30,000.00	58	.128
Empty oil barrels.....	966.	35	900.00	59	.044
Grain.....	3,288 bushels.	82	2,624.00	76	.026
Horses.....	13 head.	7	1,400.00	65	.077
Hogs.....	1,354 head.	68	13,600.00	30	.167
Hay.....	185 tons.	185	3,960.00	75	.026
Lumber.....	10,151,000 feet b. m.	20,302	205,620.00	52	(¹)
Machinery.....	5 tons.	5	500.00	14	.357
Poultry.....	32,500 head.	66	12,200.00	73	.137
Potatoes, sweet.....	365 bushels.	11	330.00	31	.077
Peanuts.....	5,725 bushels.	80	6,000.00	22	.128
Rosin.....	5,905 barrels.	625	15,625.00	63	.02
Shingles.....	198,000.	99	960.00	70	.014
Turpentine, spirits.....	1,377 barrels.	210	31,000.00	52	.042
Turpentine, crude.....	2,702 barrels.	405	8,100.00	63	.022
Tax.....	6,400 barrels.	960	14,400.00	61	.022
Timber.....	11,433,000 feet b. m.	34,289	102,897.00	46	(¹)
Vegetables.....	300 packages.	15	375.00	40	.075
Watermelons.....	940.	9	135.00	58	(¹)
Wood.....	2,655 cords.	2,655	10,620.00	38	(¹)
Miscellaneous.....	64 tons.	64	3,200.00	78	.026
Total.....		64,820	911,720.00		
UPSTREAM.					
Brick.....	94,600.	227	711.00	48	.021
Cement.....	582 tons.	582	4,947.00	107	(¹)
Coal.....	626 tons.	626	2,504.00	38	.02
Cotton seed.....	44 tons.	44	1,845.00	99	.057
Cottonseed meal.....	227 tons.	227	7,491.00	35	.105
Cottonseed hulls.....	27 tons.	27	351.00	19	.169
Dry goods.....	74 tons.	74	55,500.00	59	.06
Fertilizer.....	2,528 tons.	2,528	58,480.00	66	.075
Fish, salt.....	992 barrels.	35	3,500.00	75	.04
Fish, fresh.....	15 boxes.	2	200.00	40	.13
Furniture.....	19 tons.	19	2,375.00	47	(¹)
Fertilizer material.....	10,068.	10,068	261,700.00	4	.044
Gasoline.....	132 barrels.	23	1,194.00	60	.074
Grain.....	47,500 bushels.	1,186	38,240.00	53	.032
Groceries.....	806 tons.	806	101,000.00	30	.065
Hardware.....	158 tons.	158	22,120.00	65	.077
Hay.....	582 tons.	582	13,968.00	60	.081
Horses.....	7 head.	4	800.00	64	.047
Ice.....	484 tons.	484	3,388.00	64	(¹)
Kerosene.....	1,423 barrels.	259	7,770.00	64	.015
Lumber.....	765,000 feet b. m.	1,570	15,700.00	49	.07
Lime.....	1,108 barrels.	139	1,278.80	79	(¹)
Machinery.....	372 tons.	372	37,200.00	30	.031
Piles, iron sheet.....	600 tons.	600	19,800.00	34	.056
Phosphate rock.....	12,799 tons.	12,799	63,995.00	4	.01
Potatoes, Irish.....	620 bushels.	19	627.00	34	.04
Stones.....	1,056 tons.	1,056	1,584.00	30	.025
Salt.....	4,687 sacks.	228	2,624.00	71	.031
Soft drinks.....	3,678 crates.	230	7,360.00	54	.025
Shingles.....	30,500.	15	150.00	108	.01
Vegetables.....	100 packages.	5	125.00	75	.04
Miscellaneous.....	95 tons.	95	4,760.00	81	.025
Total.....		35,210	763,282.80		
RECAPITULATION.					
Total downstream.....		64,820	911,720.00		
Total upstream.....		35,210	763,282.80		
Grand total.....		100,030	1,675,002.80		

¹ Carried by owners.² Cargo.

21. NORTHEAST AND BLACK RIVERS AND CAPE FEAR RIVER ABOVE WILMINGTON, N. C.

(A) NORTHEAST RIVER, N. C.

No field operations were carried on during the year. The expenditures of the year amounted to \$105.89, which were for collecting commercial statistics and inspecting bridges, all for maintenance.

APPROPRIATIONS.

Sept. 18, 1890.....	\$5, 000
July 13, 1892.....	5, 000
Aug. 18, 1894.....	5, 000
Mar. 3, 1899.....	2, 000
June 13, 1902 (allotted July 14, 1902).....	2, 000
June 13, 1902 (allotted June 13, 1904, emergency appropriation).....	500
Mar. 3, 1905 (allotted Apr. 3, 1905).....	2, 000
Mar. 2, 1907 (allotted Apr. 5, 1907).....	2, 000
Mar. 3, 1909 (allotted Mar. 22, 1909).....	6, 000
June 25, 1910 (allotted July 29, 1910).....	¹ 1, 200
July 25, 1912 (allotted Aug. 15, 1912).....	3, 500
Mar. 4, 1913 (allotted Apr. 9, 1913).....	² 3, 500
Oct. 2, 1914 (allotted Oct. 28, 1914).....	2, 500
Total.....	40, 200

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year over the lower 52 miles, above which it is only navigable during freshet stages.

Vessel classification.

Classes.	Ameri- can.	Foreign.	Total.	Net regis- tered ton- nage.
Registered:				
Steamships.....	.....	4	4	6, 561
Steamers.....	5	.....	5	89
Gasoline.....	6	.....	6	48
Sailing.....	2	.....	2	1, 058
Total.....	13	4	17	7, 756

Fifteen to twenty flats are operated irregularly on the river.
Number of passengers transported during the year, 871.

- ¹ Original allotment \$2,000, decreased by \$800 transferred to Black River.
² Original allotment \$3,000, increased by \$500 transferred from Black River.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
				<i>Miles.</i>	
UPSTREAM.					
Brick.....	76,000.....	190	\$570.00	44	\$0.023
Cement.....	5 tons.....	5	42.50	50	.03
Coal.....	152 tons.....	152	808.00	50	(¹)
Cottonseed hulls.....	182 tons.....	182	2,396.00	55	.086
Cottonseed meal.....	356 tons.....	356	11,748.00	53	.088
Dry goods.....	50 tons.....	50	37,500.00	49	.204
Fertilizer.....	2,281 tons.....	2,281	79,835.00	69	.029
Furniture.....	7 tons.....	7	875.00	43	.14
Fertilizer material.....	21,308 tons.....	21,308	532,700.00	20	(¹)
Fish, salt.....	80 barrels.....	4	400.00	30	.15
Gasoline.....	306 barrels.....	54	2,808.00	53	(¹)
Grain.....	23,295 bushels.....	532	18,624.00	28	.071
Groceries.....	739 tons.....	739	92,375.00	41	.086
Hardware.....	143 tons.....	143	20,020.00	50	.04
Hay.....	123 tons.....	123	2,952.00	43	.047
Horses.....	47 head.....	24	4,800.00	31	.161
Ice.....	23 tons.....	23	161.00	30	.067
Kerosene.....	369 barrels.....	67	2,010.00	43	.07
Lumber.....	37,000 feet b. m.....	74	740.00	38	.033
Lime.....	385 barrels.....	48	441.60	42	.028
Phosphate rock.....	4,735 tons.....	4,735	23,675.00	2	(¹)
Potatoes, Irish.....	645 bushels.....	19	627.00	34	.071
Salt.....	3,150 sacks.....	221	1,768.00	49	.031
Soft drinks.....	987 crates.....	62	1,984.00	49	.061
Shingles.....	12,500.....	6	60.00	20	.05
Timber.....	1,181,000 feet b. m.....	3,543	10,629.00	11	(¹)
Total.....		34,998	850,319.10		
DOWNSTREAM.					
Cattle.....	418 head.....	104	10,400.00	70	.057
Cotton.....	2,492 bales.....	621	149,040.00	67	.045
Cotton seed.....	862 tons.....	852	35,784.00	76	.027
Eggs.....	1,236 crates.....	31	9,300.00	44	.182
Empty oil barrels.....	513.....	19	475.00	51	.039
Hogs.....	942 head.....	47	9,400.00	38	.152
Hay.....	10 tons.....	10	240.00	20	.10
Lumber.....	2,840,000 feet b. m.....	5,680	56,800.00	48	(¹)
Poultry.....	15,446 head.....	31	6,200.00	48	.208
Potatoes, sweet.....	3,518 bushels.....	115	3,450.00	21	.114
Potatoes, Irish.....	1,000 bushels.....	30	990.00	20	.12
Peanuts.....	34,400 bushels.....	482	36,150.00	39	.064
Roan.....	70 barrels.....	11	275.00	84	.015
Shingles.....	4,632,000.....	2,316	23,160.00	33	(¹)
Tar.....	183 barrels.....	27	406.00	48	.028
Timber.....	7,001,000 feet b. m.....	21,003	63,009.00	38	(¹)
Turpentine, crude.....	325 barrels.....	49	980.00	20	.067
Watermelons.....	7,500.....	75	1,125.00	44	(¹)
Wood.....	1,615 cords.....	1,615	6,460.00	37	(¹)
Total.....		33,118	413,643.00		
RECAPITULATION.					
Total upstream.....		34,998	850,319.10		
Total downstream.....		33,118	413,643.00		
Grand total.....		68,116	1,263,962.10		

¹ Carried by owners.**(B) BLACK RIVER, N. C.**

Snagging operations were carried on by the Government hoister *Black* from March 20 to June 30, 1916, thoroughly snagging the river between a point 2 miles below Point Caswell and Clear Run.

There were removed from the channel 612 logs, 324 saw logs, 324 stumps, 392 trees, 853 large snags, 64 cords of small snags, and from the banks 218 trees and 35 cords of brush were cut and hauled

back, and 77 trees trimmed, making the total number of obstructions removed 2,899. The total cost of this work, all of which was for maintenance, was \$1,751.34 or an average of 60.4 cents for each obstruction removed.

The river is in fair condition up to a point 2 miles below Point Caswell and in good condition above that point, the governing low-water depth at present being 5 feet to Point Caswell, 2½ feet to Hawes Narrows, and 1½ feet to Clear Run.

APPROPRIATIONS.

Aug. 5, 1886.....	\$3, 000
July 13, 1892.....	10, 000
Aug. 18, 1894.....	2, 000
June 3, 1896.....	1, 000
Mar. 3, 1899.....	2, 000
June 13, 1902 (allotted July 12, 1902).....	2, 000
June 13, 1902 (allotted June 13, 1904), emergency appropriation.....	500
Mar. 3, 1905 (allotted Apr. 7, 1905).....	2, 000
Mar. 2, 1907 (allotted Apr. 5, 1907).....	2, 000
Mar. 3, 1909 (allotted Mar. 22, 1909).....	4, 000
June 25, 1910 (allotted July 26, 1910).....	2, 800
July 25, 1912 (allotted Aug. 15, 1912).....	2, 500
Mar. 4, 1913 (allotted Apr. 9, 1913).....	500
Oct. 2, 1914 (allotted Oct. 26, 1914).....	2, 000
Total.....	36, 800

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year over the lower 24 miles and navigable only during freshet stages above that point.

Vessel classification.

Registered steamers, American.....	4
Net registered tonnage.....	64
Number of passengers transported during the year.....	175

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
DOWNSTREAM.				<i>Miles.</i>
Basket bottoms.....	2,000,000.....	1,000	\$17,400.00	24
Cattle.....	308 head.....	77	7,700.00	40
Cotton.....	313 bales.....	78	18,720.00	42
Cotton seed.....	289 tons.....	289	12,138.00	47
Eggs.....	1,145 crates.....	29	8,700.00	45
Empty oil barrels.....	201.....	8	200.00	46
Hogs.....	1,018 head.....	51	10,200.00	49
Lumber.....	1,924,000 feet b. m.....	3,848	38,480.00	49
Machinery.....	5 tons.....	5	500.00	50
Poultry.....	4,440 head.....	9	1,800.00	45
Peanuts.....	5,025 bushels.....	70	5,250.00	30
Potatoes:				
Irish.....	100 bushels.....	3	99.00	20
Sweet.....	265 bushels.....	8	240.00	50

* Original allotment \$2,000, increased by \$800 transferred from Northeast River.

* Original allotment \$3,500, decreased by \$1,000 transferred to Cape Fear River above Wilmington.

* Original allotment \$3,000, decreased by \$2,000 transferred to Cape Fear River above Wilmington, and by \$500 transferred to Northeast River.

Freight traffic—Continued.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
DOWNSTREAM—continued.				<i>Miles.</i>
Rosin.....	1,265 barrels.....	202	\$5,050.00	50
Shingles.....	40,000.....	20	200.00	43
Tar.....	1,879 barrels.....	282	4,240.00	48
Timber.....	4,480,000 feet b. m.....	13,440	40,320.00	23
Turpentine:				
Spirits.....	265 barrels.....	60	6,000.00	50
Crude.....	650 barrels.....	98	1,960.00	49
Wood.....	279 cords.....	279	1,116.00	22
Total.....		19,856	180,303.00	
UPSTREAM.				
Brick.....	45,100.....	113	389.00	43
Cement.....	37 tons.....	37	314.50	44
Cottonseed hulls.....	22 tons.....	22	266.00	36
Cottonseed meal.....	152 tons.....	152	5,016.00	47
Dry goods.....	22 tons.....	22	16,500.00	38
Fertilizer.....	1,047 tons.....	1,047	36,645.00	50
Fish, salt.....	155 barrels.....	8	800.00	45
Furniture.....	10 tons.....	10	1,250.00	38
Gasoline.....	72 barrels.....	13	676.00	50
Grain.....	14,500 bushels.....	263	11,616.00	23
Groceries.....	301 tons.....	301	37,625.00	48
Hardware.....	60 tons.....	60	8,400.00	50
Hay.....	383 tons.....	383	9,192.00	43
Ice.....	23 tons.....	23	161.00	50
Kerosene.....	185 barrels.....	34	1,020.00	50
Lime.....	164 barrels.....	21	193.20	47
Machinery.....	3 tons.....	3	300.00	50
Potatoes, Irish.....	380 bushels.....	11	363.00	30
Salt.....	425 sacks.....	21	168.00	50
Soft drinks.....	543 crates.....	34	1,089.00	49
Total.....		2,678	131,952.70	
RECAPITULATION.				
Total downstream.....		19,856	180,303.00	
Total upstream.....		2,678	131,952.70	
Grand total.....		22,534	312,255.70	

(C) CAPE FEAR RIVER ABOVE WILMINGTON.

Work during the year was carried on by Government plant and hired labor. The *General H. G. Wright* was employed a total of 19½ days snagging and clearing banks between a point 39 miles above Wilmington and a point 72 miles above. She removed from the channel 77 logs, 81 trees, and 10 stumps, and cleared from the banks 275 trees. She also removed one sunken lighter from the channel at Elizabethtown landing, 74 miles above Wilmington.

During the remainder of the year the *General H. G. Wright* was employed on lock-and-dam work at Kings Bluff and Browns Landing.

The expenditures for the fiscal year were all for maintenance, as follows:

Operation of snag boat <i>General H. G. Wright</i>	\$584.10
Office expenses and superintendence.....	25.00
Total.....	609.10

The average cost for each obstruction removed from the channel and banks was \$1.37.

As a result of the year's work a fairly cleared natural channel at low water was maintained from Wilmington, 7 feet deep to Browns Land-

ing, 72 miles above Wilmington; and 2 feet deep to Fayetteville, 115 miles above Wilmington. As the river runs through a wooded country, however, trees and logs are brought into the channel by each of the numerous freshets.

APPROPRIATIONS.

Prior to present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 420)-----	\$142,250
Present project:	
June 13, 1902 (allotted July 12, 1902)-----	\$8,000
Mar. 3, 1905 (allotted Apr. 7, 1905)-----	5,000
Mar. 2, 1907 (allotted Apr. 1, 1907)-----	5,000
June 25, 1910 (allotted July 29, 1910)-----	3,000
Feb. 27, 1911 (allotted Apr. 7, 1911)-----	3,500
July 25, 1912 (allotted Aug. 15, 1912)-----	¹ 6,000
Mar. 4, 1913 (allotted Apr. 9, 1913)-----	² 8,000
Oct. 2, 1914 (allotted Oct. 26, 1914)-----	6,000
	<hr/> 42,500
Total -----	184,750

22. SHALLOTTE RIVER, N. C.

No field operations were carried on during the year. The expenditures of the year amounted to \$16, which were for collecting commercial statistics, all for maintenance.

APPROPRIATIONS.

Prior to present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 554)-----	\$3,000
Present project:	
Mar. 4, 1913-----	\$9,845
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	1,100
	<hr/> 10,945
Total -----	13,945

COMMERCIAL STATISTICS.

Season of navigation, 1915: Navigable the entire year.

Vessel classification.

Registered schooners, American-----	6
Net registered tonnage-----	63

¹ Original allotment \$5,000, increased by \$1,000 transferred from Black River.

² Original allotment \$6,000, increased by \$2,000 transferred from Black River.

Freight traffic.

Commodities.	Amount in customary units.	Amount in short tons.	Value.	Average haul.
IMPORTS.				<i>Miles.</i>
Brick.....	87,000.....	218	\$654.00	9
Cement.....	1 ton.....	1	8.60	9
Cottonseed hulls.....	2 tons.....	2	26.00	9
Cottonseed meal.....	127 tons.....	127	4,191.00	9
Dry goods.....	29 tons.....	29	21,750.00	9
Fertilizer.....	420 tons.....	420	14,700.00	9
Furniture.....	7 tons.....	7	875.00	9
Gasoline.....	611 barrels.....	107	5,564.00	9
Grain.....	2,875 bushels.....	72	2,304.00	9
Groceries.....	537 tons.....	537	67,125.00	9
Hardware.....	392 tons.....	392	54,880.00	9
Hay.....	73 tons.....	73	1,752.00	9
Ice.....	20 tons.....	20	140.00	9
Kerosene.....	161 barrels.....	29	870.00	9
Lumber.....	16,700 feet b. m.....	33	330.00	9
Lim.....	253 barrels.....	32	264.40	9
Machinery.....	12 tons.....	12	1,200.00	9
Potatoes, Irish.....	133 bushels.....	4	132.00	9
Salt.....	2,270 sacks.....	114	912.00	9
Soft drinks.....	620 crates.....	39	1,248.00	9
Total.....		2,268	178,955.90	
EXPORTS.				
Cotton.....	715 bales.....	179	42,980.00	9
Cotton seed.....	121 tons.....	121	5,502.00	9
Clams.....	2,386 bushels.....	119	2,380.00	2
Eggs.....	1,416 crates.....	36	10,600.00	9
Fish, fresh.....	30 boxes.....	8	300.00	9
Fish, salt.....	2,530 barrels.....	117	11,700.00	1
Hogs.....	60 head.....	3	600.00	9
Lumber.....	308,000 feet b. m.....	612	6,120.00	9
Poultry.....	5,530 head.....	11	2,200.00	9
Peanuts.....	2,700 bushels.....	38	2,850.00	9
Potatoes, sweet.....	1,445 bushels.....	43	1,200.00	9
Rosin.....	3,634 barrels.....	581	14,525.00	9
Turpentine, spirits.....	873 barrels.....	196	19,600.00	9
Turpentine, crude.....	40 barrels.....	7	140.00	9
Tar.....	1,080 barrels.....	169	2,385.00	9
Wood.....	20 cords.....	20	80.00	9
Total.....		2,254	123,132.00	
INTERNAL.				
Upstream:				
Fish, fresh.....	110 boxes.....	11	1,100.00	8
Oysters.....	300 bushels.....	32	400.00	8
Timber.....	475,000 feet b. m.....	1,425	4,275.00	6
Total.....		1,468	5,775.00	
Downstream: Timber.....	100,000 feet b. m.....	300	900.00	3
RECAPITULATION.				
Total imports.....		2,268	178,955.90	
Total exports.....		2,254	123,132.00	
Total upstream (internal).....		1,468	5,775.00	
Total downstream (internal).....		300	900.00	
Grand total.....		6,290	308,762.90	

IMPROVEMENT OF RIVERS AND HARBORS IN THE CHARLESTON,
S. C., DISTRICT.

REPORT OF MAJ. G. A. YOUNGBERG, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Waccamaw River, N. C. and S. C.-----	2241	7. Inland waterways between Charleston Harbor, S. C., and Alligator Creek (opposite McClellanville), S. C.---	2258
2. Little Peedee River, S. C.----	2245	8. Harbor at Charleston, S. C. (including Ashley River)---	2260
3. Great Peedee River, S. C.----	2246		
4. Winyah Bay, S. C.-----	2248		
5. Santee, Wateree and Congaree Rivers, and Estherville-Minim Creek Canal, S. C.---	2252		
6. Operating and care of lock and dam across Congaree River, S. C.-----	2258		

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 597 TO 626.

1. WACCAMAW RIVER, N. C. AND S. C.

Dredging which was in progress at the close of the previous fiscal year under contract with the Hillsboro Dredging Co., of Tampa, Fla., was continued by a supplemental agreement approved July 24, 1915, until May 12, 1916, when the work was completed. The dredging was originally divided into two sections, the first extending from Bull Creek, 23 miles from Georgetown and 21 miles from the mouth of the river, to Bucksville, a distance of 13 miles, and the second from this point on to Conway. In the first section the work was skimming, and in the second section heavy cutting. The prices paid were 23 cents and 13.7 cents, respectively, with an allowance in each case of half price for overdepth dredging to 1 foot. The distance dredged during the year was 7.66 miles, all of which was heavy cutting in the second section. There were removed 397,479 cubic yards, of which 305,695 cubic yards were for dredging to 12-foot depth, and 91,784 cubic yards were covered by the 1-foot overdepth allowance. All material was deposited through pipe line along the shore. In addition to the above, the contractor removed 827 logs and 159 snags and stumps, for which he was paid \$3,523.97, based on the average hourly earnings of the dredge as provided by the terms of the contract. The dredging was completed to Conway, S. C., forming a channel 12 feet deep and 80 feet wide, except at a point 3,000 feet below the Atlantic Coast Line Railway bridge, where a rock shoal 350 feet long was en-

countered, over which the project depth was not obtained. Here the controlling depth at low water is 9 feet, but due to tidal influence a depth of 10.5 feet or better can be counted on at some part of every day.

All expenses were for new work, chargeable as follows:

Removing 397,479 cubic yards.....	\$48,167.42
Removing logs and snags.....	3,522.97
Surveys and inspection.....	2,312.65
Depot.....	798.59
Charleston office.....	3,159.37

Total.....	57,859.00
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The cost per cubic yard was therefore 13.69 cents.

APPROPRIATIONS.

Existing project:

June 14, 1880.....	\$15,000.00
Mar. 3, 1881.....	10,000.00
Aug. 2, 1882.....	4,400.00
July 5, 1884.....	6,000.00
Aug. 5, 1886.....	15,000.00
Aug. 11, 1888.....	15,000.00
Sept. 19, 1890.....	12,500.00
July 13, 1892.....	10,000.00
Aug. 18, 1894.....	6,000.00
June 3, 1896.....	6,000.00
Mar. 3, 1899.....	3,000.00
June 13, 1902 (allotment Oct. 30, 1902).....	9,000.00
Mar. 3, 1905 (allotment Apr. 15, 1905).....	13,800.00
Mar. 2, 1907 (allotment Mar. 15, 1907).....	18,000.00
Mar. 3, 1909 (allotment Apr. 9, 1909).....	4,000.00
June 25, 1910.....	50,000.00
July 25, 1912.....	25,000.00
Mar. 4, 1913.....	30,000.00
Mar. 4, 1915 (allotment Apr. 1, 1915).....	40,000.00
Mar. 4, 1915 (allotment Dec. 24, 1915).....	12,000.00
July 27, 1916.....	8,500.00
Total.....	313,200.00
Receipts on account of sales.....	573.12
Grand total.....	313,773.12

CONTRACTS IN FORCE.

Contractor: Hillsboro Dredging Co., Tampa, Fla.
 Character and amount of work: Dredging, 247,847 cubic yards.
 Unit price: 13.7 and 23 cents per cubic yard.
 Date of approval: June 19, 1914.
 Date fixed for commencement: October 22, 1914 (extended to Jan. 21, 1915).
 Date of actual commencement: February 6, 1915.
 Date fixed for completion: August 18, 1915.
 Completed May 12, 1916.

SUPPLEMENTAL.

Contractor: Hillsboro Dredging Co., Tampa, Fla.
 Character and amount of work: Dredging, 219,400 cubic yards.
 Unit price: 13.7 cents per cubic yard.
 Date of approval: July 24, 1915.
 Date fixed for commencement: August 19, 1915.
 Date of actual commencement: August 19, 1915.
 Date fixed for completion: May 12, 1916.
 Completed May 12, 1916.

COMMERCIAL STATISTICS.

(Jan. 1, 1915, to Dec. 31, 1915.)

Freight traffic.

Articles.	Short tons.	Value.
BELOW CONWAY.		
Brick.....	22.0	887
Cattle.....	6.0	609
Cement.....	31.0	372
Coal.....	2,308.0	9,523
Cotton, short.....	1,132.0	271,680
Cotton seed.....	188.0	8,640
Cottonseed meal.....	153.0	8,355
Croasties.....	56.0	172
Dry goods.....	200.0	150,000
Eggs.....	3.0	75
Empty barrels.....	62.0	1,550
Empty crates and bottles.....	5.0	50
Fertilizer.....	1,254.0	37,620
Fish.....	42.0	4,200
Furniture.....	12.0	1,500
Groceries and canned goods.....	1,930.0	144,741
Grain and feed.....	593.0	23,800
Hay.....	136.0	4,080
Hardware, iron, and steel.....	312.0	43,680
Hogs.....	7.0	1,400
Horses and mules.....	11.0	2,200
Ice.....	63.0	504
Lumber.....	16,693.0	116,998
Lime.....	107.0	594
Logs.....	12,241.0	37,320
Miscellaneous general merchandise.....	406.0	46,600
Oils and paints.....	63.0	3,780
Oysters and clams.....	10.0	2,589
Oyster shells.....	32.0	318
Potatoes.....	161.0	5,313
Pepper sauce.....	2.5	1,240
Peppers in brine.....	2.0	91
Rosin.....	191.0	4,011
Salt.....	236.0	1,888
Soft drinks.....	54.0	1,728
Sand.....	2,600.0	2,600
Shingles.....	6,339.0	46,559
Tar.....	42.0	630
Turpentine, spirits.....	38.0	2,660
Turpentine, crude.....	16.0	320
Vegetables.....	82.0	4,132
Total.....	48,016.0	968,890
ABOVE CONWAY.		
Bricks.....	11.0	33
Cotton, short.....	185.8	44,592
Cotton seed.....	489.0	14,670
Cottonseed meal.....	85.6	2,596
Cement.....	2.2	26
Croasties.....	138.9	989
Dry goods.....	8.0	6,000
Eggs.....	1.8	45
Empty oil barrels.....	2.0	50
Fertilizer.....	760.0	23,070
Furniture.....	5.0	625
Gasoline.....	4.0	200
Grain and feed.....	68.6	2,744
Groceries and canned goods.....	262.6	19,635
Hardware, iron, and steel.....	20.9	4,186
Hay.....	9.6	288
Kerosene.....	10.0	250
Lumber, dressed.....	23.2	290
Lumber, rough.....	5,431.0	27,172
Logs.....	2,998.0	59,041
Lime.....	1.6	11
Poultry.....	3.5	700
Peanuts.....	1.0	70
Potatoes, Irish.....	48.0	1,584
Potatoes, sweet.....	1.5	50
Rosin.....	16.0	336
Soft drinks.....	5.3	170
Shingles.....	147.0	1,382
Turpentine, spirits.....	3.0	210
Turpentine, crude.....	14.0	280
Tar.....	3.0	45
Wood.....	1,820.0	2,900
Total.....	35,632.1	214,680
Aggregate.....	83,648.6	1,203,570

Vessels using the river below Conway were seven steamers (with a net tonnage of 259 tons), making 553 round trips between Conway and Georgetown, and two small gasoline boats, making 34 round trips. The business above Conway was handled by one steamboat and one gasoline boat, making 82 trips to Red Bluff and return.

List of vessels handling freight below Conway, calendar year 1915.

Name.	Class.	Net tonnage.	Dimensions.			Trips each way.
			Length.	Breadth.	Depth.	
			<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
Comanche.....	St. s.	54	86.4	17.2	5.0	156
F. G. Burroughs.....	St. p.	84	120.0	20.0	5.0	151
Mitchelle, C.	St. p.	76	100.0	20.0	5.0	4
Fearless.....	St. s.	9	58.0	11.0	4.0	140
Dixie.....	St. s.	20	60.0	14.0	4.0	52
E. B. Malone.....	St. s.	10	37.4	14.0	4.3	104
Pathfinder.....	Ga. s.	6	34.1	8.1	3.8	14
Gracie L.....	Ga. s.	12	51.3	12.8	5.0	80
Alafair.....	St. s.	6	35.0	9.0	3.0	16

¹ Trips each way approximate.

Vessel classification below Conway.

Classes.	American.	Net registered tonnage.	Limits of draft.	Cargoes.	
				Commodities.	Tons.
Registered:			<i>Feet.</i>		
Steamers.....	311	21,412	5.5-7.0	General.....	15,787
Tugs (towboat duty).....	206	2,500	3.5-7.8	Lumber, logs, etc.	32,187
Launch.....	30	360	4.0	General.....	42
Total.....	547	24,272			48,016

Passengers carried, 18,170.

List of vessels handling freight above Conway, calendar year 1915.

Name.	Class.	Net tonnage.	Dimensions.			Trips each way.
			Length.	Breadth.	Depth.	
			<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
Bertie.....	St. s.		49.5	9.5	3.8	62
Lillian L.....	Ga. s.	7	38.4	8.4	4.0	20

Vessel classification above Conway.

Classes.	American.	Net registered tonnage.	Limits of draft.	Cargoes.	
				Commodities.	Tons.
Registered launch (towboat).....	20	140	<i>Feet.</i> 4.2	General and lumber....	2,408.0
Unregistered launch (towboat).....	62		4.0	do.....	7,226.1
Rafts.....				Logs.....	25,998.0
Total.....	82	140			35,632.1

2. LITTLE PEEDEE RIVER, S. C.

No operations were in progress during the year.

APPROPRIATIONS.

Existing project:	
Aug. 11, 1888.....	\$5,000.00
Sept. 19, 1890.....	5,000.00
July 13, 1892.....	5,000.00
Aug. 18, 1894.....	4,000.00
June 8, 1896.....	3,000.00
June 13, 1902 (allotment, Oct. 30, 1902).....	1,500.00
Mar. 3, 1905 (allotment, Apr. 15, 1905).....	1,200.00
Mar. 2, 1907 (allotment, Mar. 15, 1907).....	2,000.00
June 25, 1910.....	20,000.00
Total	46,700.00
Transferred under river and harbor act, Mar. 4, 1915, to Winyah Bay, S. C.....	1,500.00
Net total	45,200.00
Receipts account of sales.....	110.40
Total receipts from all sources	45,310.40

COMMERCIAL STATISTICS.

[Jan. 1, 1915, to Dec. 31, 1915.]

Freight traffic.

Articles.	Short tons.	Value.
Cotton, short.....	196.0	\$47,040
Cottonseed meal.....	1.7	59
Crossties.....	6.0	20
Fertilizer.....	634.0	19,020
Groceries and canned goods.....	26.0	1,875
Grain.....	28.0	1,120
Hardware, iron and steel.....	3.0	420
Lumber.....	458.0	2,745
Logs.....	76.0	228
Oils.....	1.5	90
Salt.....	6.0	48
Shingles.....	7.0	38
Total	1,442.2	72,703

The commerce compared with that for the preceding year shows a decrease in tonnage but an increase in value, due to an increase in the amount of cotton and fertilizer handled, the value of each of which is high. The traffic has been handled by one steamboat making 23 trips, and two tugs making 4 trips. No regular scheduled service is maintained.

List of vessels handling freight during calendar year 1915.

Name.	Class.	Net tonnage.	Dimensions.			Trips each way
			Length.	Breadth.	Depth.	
			<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
Ruth.....	St. p....	53	81	26	4	23
Dixie (tug).....	St. s....	20	60	14	4	3
Alafair (tug).....	St. s....	6	35	9	3	1

Vessel classification.

Classes.	Ameri- can.	Net registered tonnage.	Limits of draft.	Cargoes.	
				Commodities.	Tons.
Registered:					
Steamers.....	23	1,219	Feet. 3.5	General.....	908
Tugs (towboat duty).....	4	66	2.5-6.8	Lumber and logs.....	584
Total.....	27	1,285			1,442

The above includes all vessels that operated on Little Pee Dee River during the year.

3. GREAT PEDEE RIVER, S. C.

During the fiscal year the U. S. snag boat *Wateree* between July 1 and October 11, 1915, carried on snagging operations over 68 miles of this river, removing obstructions as follows:

Overhanging trees felled and cut up.....	444
Logs removed from river.....	962
Stumps removed.....	644
Snags removed.....	1,006
Total.....	3,056

Unit cost per obstruction (field cost), 99.5 cents.

The expenses for the year were as follows:

Field cost, snag boat <i>Wateree</i>	\$3,039.28
Surveys and inspection.....	188.49
Georgetown suboffice and depot expenses.....	557.06
Charleston office expenses.....	312.20

All expenses are chargeable to maintenance. Work was done by hired labor with Government plant. At the end of the fiscal year the river was in fair condition and navigation was reasonably safe.

APPROPRIATIONS.

Existing project:	
June 14, 1880.....	\$7,000.00
Mar. 3, 1881.....	6,000.00
Aug. 2, 1882.....	6,000.00
July 5, 1884.....	8,000.00
Aug. 5, 1886.....	20,000.00
Aug. 11, 1888.....	20,000.00
Sept. 19, 1890.....	12,500.00
July 13, 1892.....	10,000.00
Aug. 18, 1894.....	6,000.00
June 3, 1896.....	12,000.00
Mar. 3, 1899.....	4,000.00
June 13, 1902.....	22,500.00
Mar. 3, 1903.....	40,000.00
Apr. 28, 1904.....	10,000.00
Mar. 3, 1905 (sundry civil).....	15,000.00
Mar. 3, 1905 (river and harbor).....	5,000.00
Mar. 2, 1907 (river and harbor).....	20,000.00
Mar. 4, 1907 (sundry civil).....	30,000.00
May 27, 1908.....	11,300.00
Mar. 3, 1909 (allotment Apr. 7, 1909).....	10,000.00
June 25, 1910.....	30,000.00
July 25, 1912.....	10,000.00
Mar. 4, 1913.....	15,000.00

Existing project—Continued.

Oct. 2, 1914 (allotment Oct. 7, 1914)	\$10,000.00
July 27, 1916	5,000.00
Total	845,300.00
Transferred under river and harbor act Mar. 4, 1915, to Winyah Bay, S. C.	5,000.00
Net total	840,300.00
Receipts on account of sales	379.08
Total	840,679.08

COMMERCIAL STATISTICS.

[Jan. 1, 1915, to Dec. 31, 1915.]

Freight traffic.

Articles.	Short tons.	Value.
Brick	10	\$30
Cotton, short	1,213	201,120
Cotton seed	148	4,440
Cottonseed meal	16	525
Cross-ties	195	544
Dry goods	8	6,000
Fertilizer	840	24,800
Feed and grain	146	4,840
Groceries and canned goods	452	23,900
Hardware and steel	30	4,200
Hay	6	180
Ice	10	400
Lumber	2,226	14,835
Logs	9,690	20,513
Miscellaneous general merchandise	249	24,900
Naval stores	14	630
Oil and paints	51	3,060
Salt	48	384
Shingles	424	2,155
Total	15,758	446,966

List of vessels handling freight on Great Pee Dee River, calendar year 1915.

Name.	Class.	Net tonnage.	Dimensions.			Trips each way.
			Length.	Breadth.	Depth.	
Ethel	St. p.	77	Feet. 119.0	Feet. 27.2	Feet. 4.0	50
Brunswick	St. s.	67	90.0	22.0	6.0	2
Lelia	St. s.	8	45.0	11.0	3.9	42
Dixie	St. s.	20	60.0	14.0	4.0	4
E. B. Masons	St. s.	10	37.4	10.0	4.3	14
Pathfinder	Ga. s.	6	36.1	8.1	3.8	1

¹ Approximate.

Vessel classification.

Classes.	Ameri-can.	Net registered tonnage.	Limits of draft.	Cargoes.	
				Commodities.	Tons.
Registered:					
Steamers	52	3,984	Feet. 4.5-5.5	General	4,698
Tugs (towboat duty)	81	762	4.0-5.8	Logs, lumber, and general.	11,060
Total	133	4,746			15,758

The average haul of freights is 50 miles. Vessels freighting on this stream were two steamers of 77 and 67 tons and four tugs of from 8 to 20 net tons making 133 round trips for the fleet. No regular schedule was maintained by any boat during the year. Commerce for the year shows a slight decrease in both tonnage and value due to improved railroad facilities. The poor condition of roads approaching the river and the lack of freight houses at the steamer landings places the river service at a disadvantage in competition with the rail service.

4. WINYAH BAY, S. C.

All work done here was by hired labor with Government plant. The nature of the work done and expenditures made during the past fiscal year in connection with the improvement were as follows:

WESTERN AND JETTY CHANNELS AND SAMPIT RIVER BAR.

The U. S. seagoing hopper dredge *Winyah Bay* was engaged for one and one-half months in the Western Channel in the removal of shoals to restore project dimensions. These shoals occurred principally at the lower end, narrowing the channel to 200 feet in places. This channel is about 6 miles long and the dredging, amounting to 92,319 cubic yards, was done in short stretches comprising about one third its length. Work on this channel was discontinued on August 14, 1915, at which time there was available a depth of 18 feet and 400 feet wide throughout. This dredge worked for about one month in the channel near the south jetty, dredging 59,955 cubic yards in the cut-off to restore the channel depth and width.

The dredge *Winyah Bay* was also operated for about three months at the mouth of the Sampit River, which had shoaled at the outer end to a depth of 15 feet at mean low water. There were removed 115,320 cubic yards of sand and mud. The total yardage for this dredge amounts to 267,594 cubic yards for five and one-half months work. She was undergoing repairs for two and one-half months and was laid up for four months on account of lack of funds.

The foregoing work was all chargeable to maintenance, divided as follows:

Field, operating dredge.....	\$18, 105. 37
Maintenance of plant:	
Repairs to dredge.....	17, 433. 42
Care of plant laid up.....	918. 06
	\$36, 456. 85
Administration, surveys, inspection, and office expenses.....	4, 521. 55
Total.....	40, 978. 40
Field cost per cubic yard.....	. 0677
Gross cost per cubic yard.....	. 1531

NOTE.—The field cost is based solely on expenditures for labor and supplies for operating plant and includes no repairs or supervision.

SAMPIT BAR AND RIVER.

At the beginning of the fiscal year work was in progress removing rock, sand, and mud from the Sampit River opposite the city of Georgetown, to form a channel 18 feet deep and 400 feet wide from a point 1 mile above the city limits to the mouth of the river. The U. S. dipper dredge *Cheraw* continued this work for a period of

eight months when she was laid up on account of lack of funds with which to prosecute the improvement. The average cut was about 5½ feet in depth by 90 feet in width, the linear distance traversed was approximately 5,000 feet. The excavated material comprised 22,575 cubic yards of rock (hard shale) and 68,637 cubic yards of sand and mud, all of which was deposited by scows on dumping ground in Waccamaw River.

The foregoing was all new work, and costs are divided as follows:

Field:	
Operating dredge.....	\$13,849.61
Towing scows.....	5,450.53
	<hr/>
	\$19,300.14
Maintenance, care of plant laid up.....	912.89
Administration, surveys, inspection, and office expenses.....	4,133.45
	<hr/>
Total.....	24,346.48
Field cost per cubic yard.....	.2239
Gross cost per cubic yard.....	.2824

The total cost of work by the U. S. dredge *Cheraw* in Sampit River to date is \$122,072.48.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 68d Cong., 3d sess., p. 580).....	\$2,500,000.00
Present project:	
June 25, 1910.....	\$150,000.00
Mar. 2, 1907 (allotment of Sept. 5, 1911).....	10,000.00
Mar. 3, 1909 (allotments of Sept. 12, 1911, and Feb. 13, 1912).....	5,991.67
July 25, 1912 (river and harbor act).....	162,000.00
Aug. 24, 1912 (sundry civil act).....	100,000.00
Mar. 4, 1913.....	120,000.00
Oct. 2, 1914 (allotment of Oct. 7, 1914).....	15,000.00
Mar. 4, 1915 (allotment of Apr. 1, 1915).....	70,000.00
July 27, 1916.....	100,000.00
	<hr/>
	732,991.67
Total.....	3,232,991.67
Received on account of sales and rent of dredge, etc.....	9,402.27
	<hr/>
Grand total.....	3,242,393.94

CONTRACTS IN FORCE.

Contractor: Estate of Marks Moses, New York, N. Y.
 Character and amount of work: Lease of site for wharf at Georgetown, S. C., 12 months.
 Unit price: \$25 per month.
 Date of approval: March 5, 1915.
 Date fixed for commencement: January 1, 1915.
 Date of actual commencement: January 1, 1915.
 Date fixed for completion: December 31, 1915.
 Completed June 30, 1916: 100 per cent.

Contractor: Clinchfield Fuel Co., Spartanburg, S. C.
 Character and amount of work: Delivery of coal, 2,000 short tons.
 Unit price: \$3.80 per ton of 2,000 pounds.
 Date of approval: April 17, 1915.
 Date fixed for commencement: April 15, 1915.

Date of actual commencement: April 15, 1915.

Date fixed for completion: March 31, 1916.

Completed June 30, 1916: 100 per cent.

Contractor: Jenkins & McKevlin, Charleston, S. C.

Character and amount of work: Towing, 12 months.

Unit price: \$575 per month.

Date of approval: May 15, 1915.

Date fixed for commencement: May 9, 1915.

Date of actual commencement: May 9, 1915.

Date fixed for completion: May 8, 1916.

Completed June 30, 1916: 100 per cent.

Contractor: Estate of Marks Moses, New York, N. Y.

Character and amount of work: Lease of site for wharf at Georgetown, S. C., 12 months.

Unit price: \$25 per month.

Date of approval: February 16, 1916.

Date fixed for commencement: January 1, 1916.

Date of actual commencement: January 1, 1916.

Date fixed for completion: December 31, 1916.

Completed June 30, 1916: 50 per cent.

COMMERCIAL STATISTICS.

[Jan. 1, 1915, to Dec. 31, 1915.]

Freight traffic.

Article.	Tons.	Value.
INWARD.		
Coal.....	587	\$3,129
Dry goods.....	427	320,250
Fertilizer.....	1,054	31,520
Fruits.....	92	8,280
Fish.....	213	51,139
Furniture.....	67	8,375
Grain and feed.....	1,552	62,080
Groceries and canned goods.....	8,191	614,325
Hay.....	622	12,440
Hardware, iron, and steel.....	2,679	370,993
Oils and paints.....	165	9,900
Potatoes, Irish.....	349	11,517
Rice.....	647	77,240
Vegetables.....	344	17,300
Whisky, wine, and beer.....	88	35,200
Miscellaneous general merchandise.....	765	76,500
Total.....	17,842	1,710,238
OUTWARD.		
Cotton, short.....	4,817	1,156,020
Cement.....	257	3,084
Crossties.....	8,896	26,687
Clams.....	85	3,440
Fertilizer.....	20	600
Grain and feed.....	10	406
Lumber.....	146,807	1,883,019
Logs.....	271	813
Miscellaneous general merchandise.....	1,115	111,500
Pine straw.....	1,804	9,606
Rosin.....	1,001	21,021
Spirits, turpentine.....	180	13,300
Shingles.....	1,197	8,553
Tar.....	296	2,540
Total.....	165,904	3,190,583
Grand total.....	183,746	4,900,821

The decrease in inbound freights is ascribed to business depression general in this section of the State. The increase in tonnage and value of outbound freights is due to increased activity in the lumber and cotton industries.

List of vessels handling freight through the port of Georgetown, S. C.

Name.	Class.	Net tonnage.	Dimensions.			Trips each way.
			Length.	Breadth.	Depth.	
CLYDE STEAMSHIP CO.						
Cherokee.....	St. s.	1,966	<i>Feet.</i> 264.0	<i>Feet.</i> 43.0	<i>Feet.</i> 18.8	26
San Marcos.....	St. s.	2,187	317.8	39.5	21.4	1
Jamestown.....	St. s.	2,126	269.5	40.0	16.8	4
Faminoles.....	St. s.	1,966	264.0	43.0	18.8	6
Yuma.....	St. s.	1,828	322.0	42.2	18.9	1
Chippewa.....	St. s.	2,155	275.9	40.1	19.5	2
Navahoe.....	St. s.	1,278	282.9	34.3	21.8	11
BALTIMORE & CAROLINA STEAMSHIP CO.						
Matilda Weems.....	St. s.	1,090	205.8	26.9	18.6	21
Henry Williams.....	St. s.	1,322	229.0	30.1	20.1	9
Alleghany.....	St. s.	1,079	260.0	38.5	16.6	5
Berkshire.....	St. s.	1,438	250.0	38.5	16.6	3
New Orleans.....	St. s.	1,017	249.0	32.0	24.4	4
Elisabeth Weems.....	St. s.	784				4
ATLANTIC COAST LUMBER CORPORATION.						
Richmond.....	St. s.	363	206.0	33.0	21.6	28
Aragon.....	St. s.	1,072	247.7	42.6	14.8	20
Katabdin.....	St. s.	1,108	239.1	38.0	14.0	21
John Bossert.....	Schr.....	492	170.7	36.0	12.8	7
Louis Bossert.....	Schr.....	488	169.6	36.2	12.8	4
Charles Wittenore.....	Schr.....	582	177.9	38.2	14.0	1
Samuel Dillaway.....	Schr.....	623	170.4	35.2	17.9	1
George H. Ames.....	Schr.....	378	150.0	34.0	11.6	1

Vessel classification (all coastwise).

Classes.	Ameri-can.	Net registered tonnage.	Limits of draft.	Cargoes.		Pas-sengers.
				Commodities.	Tons.	
Registered:			<i>Feet.</i>			
Steamers.....	69	68,787	15.5-17.0	Lumber.....	113,073	
Sailing.....	13	6,601	15.0-15.9	do.....		
Unregistered:						
Steamers.....	97	145,915	14.5-17.5	General and lumber.....	69,946	41
Sailing.....	1	378		Coal.....	587	
Total.....	180	221,681			183,666	41

The Clyde Steamship Co., engaged in general freight and passenger business, maintains a line of steamships plying regularly between this port, Wilmington, N. C., and New York. Seven different vessels of this company, making 51 round trips, entered the port during the year. The Baltimore & Carolina Steamship Co., doing a general freight business between Charleston, Georgetown and Baltimore, had 6 vessels in the service, making 46 round trips. The Atlantic Coast Lumber Corporation employed 3 steamships (making 69 trips) and 5 schooners (making 14 trips) exclusively in hauling lumber to northern ports. In addition, there are a number of small steamers and gasoline boats plying between Georgetown and villages and landings on the inland waters communicating with Winyah Bay.

5. SANTEE, WATEREE, AND CONGAREE RIVERS AND ESTHERVILLE-MINIM CREEK CANAL, S. C.

(A) SANTEE RIVER AND ESTHERVILLE-MINIM CREEK CANAL.

During the fiscal year the U. S. snag boat *Waterree* removed from the Estherville-Minim Creek Canal 25 obstructions and 1 tree from the bank of the river. The U. S. snag boat *Pedee* removed 111 obstructions from the canal.

The expenses during the year, all of which was for maintenance, were as follows:

Field cost, operating snag boats-----	\$3,052.78
Columbia suboffice expenses-----	816.08
Georgetown suboffice expenses-----	824.59
Charleston office expenses-----	814.56
Total-----	5,008.01

Work was done by hired labor with Government plant.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 550)-----	\$99,750.00
Present project:	
Sept. 19, 1890-----	\$80,000.00
July 13, 1892-----	30,000.00
Aug. 13, 1894-----	40,000.00
June 8, 1896-----	48,000.00
Mar. 3, 1899-----	20,000.00
June 13, 1902 (allotment Oct. 29, 1902)-----	15,000.00
June 13, 1902 (allotment May 26, 1904)-----	7,000.00
Mar. 3, 1905 (allotment May 10, 1905)-----	25,000.00
Mar. 2, 1907 (allotment June 15, 1907)-----	23,000.00
Mar. 3, 1909 (allotment Apr. 5, 1909)-----	¹ 5,565.03
June 25, 1910 (allotment July 16, 1910)-----	2,000.00
Feb. 27, 1911 (allotment Mar. 15, 1911)-----	12,000.00
July 25, 1912 (allotment Aug. 2, 1912)-----	15,000.00
Mar. 4, 1913 (allotment Mar. 31, 1913)-----	(*)
Oct. 2, 1914 (allotment Oct. 7, 1914)-----	6,000.00
July 27, 1916 (allotment Sept. 1, 1916)-----	15,000.00
Total-----	298,565.03
Receipts on account of sales-----	398,315.03
Grand total-----	537.32
Grand total-----	398,852.35

¹Original allotment \$33,000; Nov. 10, 1908, \$5,000 withdrawn and reallocated to Congaree River, S. C.

²Original allotment \$5,600; unexpended balance, \$34.97, withdrawn July 16, 1910, and reallocated to Congaree River, S. C.

³Original allotment \$20,000; withdrawn Aug. 18, 1914, \$10,000, and Jan. 22, 1916, \$10,000, and reallocated to Congaree River, S. C.

COMMERCIAL STATISTICS.

[Jan. 1, 1915 to Dec. 31, 1915.]

Freight traffic.

Articles.	Short tons.	Value.
Cotton, short.....	140	\$33,000
Cotton goods.....	20	3,000
Cross ties.....	389	1,225
Dry goods, clothing, etc.....	75	120,000
Fertilizer.....	115	3,450
Groceries and canned goods.....	1,164	140,400
Hardware, iron and steel.....	988	128,040
Hay, grain, and feed.....	75	3,000
Lumber.....	875	8,750
Logs.....	18,221	54,668
Miscellaneous general merchandise.....	880	120,000
Oysters shell.....	504	1,124
Oils and paints.....	578	68,940
Steel rails.....	1,370	68,500
Whiskey, wine and beer.....	4	1,600
Total.....	25,376	770,902

List of vessels handling freight on Estherville-Minim Creek Canal, calendar year 1915.

Name.	Class.	Net tonnage.	Dimensions.			Trips each way.
			Length.	Breadth.	Depth.	
			<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
Nan Elizabeth.....	St. p....	133	124.0	31.0	4.6	42
Dixie.....	St. s....	20	60.0	14.0	4.0	26
W. H. Andrews.....	St. s....	39	71.0	17.0	5.5	119
Pathfinder.....	Ga. s....	6	26.1	8.1	3.8	6

¹ Approximate.

Vessel classification.

Classes.	Ameri-can.	Net registered tonnage.	Limits of draft.	Cargoes.	
				Commodities.	Tons.
Registered:					
Steamers.....	42	10,378	<i>Feet.</i> 4.0	General.....	4,817
Tugs (towboat duty).....	51	1,297	4.0-7.8	General, logs, and lumber.	20,559
Total.....	93	12,175			25,376

The decrease in tonnage and value of freight is due to a decline in the business of transporting logs, lumber, and timber products by water (steam railways being more economical), and also to decreased tonnage carried by steamboat between Columbia and Georgetown.

(B) WATEREE RIVER, S. C.

The work of the year consisted of snagging for the purpose of clearing the natural channel of obstructions and removing overhanging trees from the banks, from the mouth of the river to Sumter

Ferry. This work has been carried on entirely by Government plant and hired labor. From July 28 to December 15, 1915, the U. S. snag boat *Pedee* worked over 88 miles of this river, and the U. S. snag boat *Wateree* between November 15 and December 3, 1915, was operated over 9 miles of this river. Much of the work by both snag boats consisted in clearing out obstructions brought down by freshets of the preceding winter.

At the end of the fiscal year the lower river was in fair condition. The work accomplished was as follows:

	Snag boat Pedee.	Snag boat Wateree.
Overhanging trees felled and cut up.....	417	79
Logs removed from river.....	2,291	164
Stumps removed from river.....	1,786	128
Snags removed from river.....	1,100	155
Total.....	5,594	526
Aggregate.....		6,120

Total distance worked over.....miles.....	38
Total amount of expenditures (field cost).....	\$7,123.09
Cost of removal per obstruction (field cost).....	\$1.16
Cost of removal per obstruction (including surveys, inspection, office expenses, etc.).....	\$1.28

The expenses during the year, all of which was for maintenance, were as follows:

Field cost of snag boat <i>Pedee</i>	\$6,579.85
Field cost of snag boat <i>Wateree</i>	543.24
Columbia suboffice expenses.....	343.75
Charleston office expenses.....	406.97
Total.....	7,873.81

APPROPRIATIONS.

Existing project:	
Mar. 3, 1881.....	\$8,000.00
Aug. 2, 1882.....	15,000.00
July 5, 1884.....	5,000.00
Aug. 5, 1886.....	7,500.00
Aug. 11, 1888.....	12,000.00
Sept. 19, 1890.....	12,500.00
July 13, 1892.....	2,500.00
Aug. 18, 1894.....	2,500.00
June 3, 1896.....	5,000.00
Mar. 3, 1899.....	2,500.00
Mar. 3, 1905 (allotment, May 10, 1905).....	25,000.00
Mar. 2, 1907 (allotment, June 15, 1907).....	50,000.00
Mar. 3, 1909 (allotment, Apr. 5, 1909).....	13,283.83
June 25, 1910 (allotment, July 16, 1910).....	14,000.00
July 25, 1912 (allotment, Aug. 2, 1912).....	6,000.00
Mar. 4, 1913 (allotment, Mar. 31, 1913).....	15,000.00
Oct. 2, 1914 (allotment, Oct. 7, 1914).....	6,000.00
Total of appropriations.....	201,783.83
Receipts on account of sales and use of snag boat.....	1,800.44
Grand total.....	203,584.27

¹ Original allotment, \$14,300; unexpended balance, \$1,016.17, withdrawn July 16, 1910, and^a reallocated to Congaree River, S. C.

COMMERCIAL STATISTICS.

Commerce on this stream is negligible. No figures could be obtained.

(C) CONGAREE RIVER, S. C.

Dredging.—The U. S. dredge *Congaree*, which was at work at the close of the fiscal year at the Southern Railway bridge at Moy, S. C., continued dredging to August 3, 1915, removing 21,586 cubic yards of sand. The dredge, pontoons, and quarter boat were towed by the tender *Richland* to a shoal below Sailors Lake, and on August 9–11, 1915, 2,476 cubic yards of sand were removed at this point. On August 13, 1915, work was begun above Granby, not far below the lock, and continued until January 21, 1916, removing 74,163 cubic yards of sand. On January 22 the dredge was laid up with a skeleton crew which was employed in care and upkeep. From February 25, 1916, to March 24, 1916, the dredge was en route to and undergoing minor repairs at Charleston, upon completion of which the plant returned to and was laid up at Columbia. With the approach of the low-water season in 1916 the plant was moved downstream in order to assist in an emergency any boat which might go aground. On account of lack of funds ordinary active operations could not be resumed and at the close of the year the plant was lying idle.

Summary of dredging, all by U. S. dredge *Congaree*:

	Cubic yards.
At Southern Railway bridge at Moy, S. C.	21,586
At shoal below Sailors Lake	2,476
At Granby Shoal	74,163
Total	98,225

Cost of this work was as follows:

Field:	
Operating dredge	\$9,423.22
Maintenance of plant—	
Repairs	\$689.47
Care of plant laid up	952.60
	1,642.07
	\$11,065.29
Administration:	
Surveys	2,122.80
Office expenses	2,248.78
	4,371.58
Total	15,436.87
Field cost per cubic yard	.113
Gross cost per cubic yard	.158

Derrick "A."—This derrick boat was employed during the year from August 2, 1915, to February 27, 1916, in drilling, blasting, and removing rock from the upper channel, about 1,261 cubic yards of stone and 50 cubic yards of sand being removed. The stone was placed as riprap on the banks.

The cost of this work was as follows:

Field:	
Operating derrick	\$3, 589. 49
Maintenance of plant laid up	52. 50
	<hr/>
	3, 641. 99
Administration, office expenses	999. 73
	<hr/>
Total	4, 641. 72

Snagging.—From July 1 to 27, 1915, the U. S. snag boat *Pedee* worked near the mouth of the river, and also at the Southern Railway bridge at Moy, S. C., removing 436 obstructions from the river channel and 73 trees from the banks. At the bridge a very miscellaneous collection of iron, old pilings, bridge timbers, and stone were removed. Part of the work was done with grapples, but the clamshell bucket was used when needed, and removed about 24 tons of stone and 105 cubic yards of sand.

The U. S. snag boat *Wateree* during the months of November-December, 1915, and January, 1916, worked over the entire river, removing 1,291 obstructions, including 433 trees. During the year the snag boat was repaired, the hull scraped and painted.

Summary of snagging:

Work by snag boat *Pedee*: 509 obstructions, including 73 trees.

Twenty-four tons of stone and 105 cubic yards of sand.

Work by snag boat *Wateree*: 1,291 obstructions, including 433 trees.

The cost of the work was as follows:

Field operations	\$3, 653. 92
Maintenance	377. 24
Office expenses	666. 15
	<hr/>
Total	4, 697. 31

All work on this river was carried on by Government plant and hired labor, and all expenditures were for maintenance. No new work was done.

Restoration of dam.—All work completed during the fiscal year.

Towing.—The tender *Richland* did all necessary towing for the work on Congaree and Wateree Rivers, and kept the dredge and snag boats supplied with coal. The cost of the tender is distributed each month and is included in each item of dredging, snagging, etc. The total cost was \$5,821.80.

Recapitulation of expenditures.

Dredging:	
Congaree	\$15, 436. 87
Derrick A	4, 641. 72
	<hr/>
	\$20, 078. 59
Snagging:	
Pedee	1, 041. 67
Wateree	3, 655. 64
	<hr/>
	4, 697. 31
	<hr/>
Total	24, 773. 90

OBSERVATIONS AT BROAD AND CONGAREE RIVERS, S. C.

Complaint was made in 1914 by the Columbia Railway & Navigation Co., of Columbia, S. C., that the storing of water by the power

dams on Broad River, seriously interfered with navigation of the Congaree River, thus disastrously affecting shipping interests. Special observations, which had been begun in August, 1914, were continued in 1915-16, the costs being defrayed by allotments from the appropriation for examinations, surveys, and contingencies of rivers and harbors. Special report was submitted to the Chief of Engineers in February, 1916. The total expenditure during the year was \$1,897.04.

APPROPRIATIONS.

Existing project:

Aug. 5, 1886.....	\$7,500.00
Aug. 11, 1888.....	7,500.00
Sept. 19, 1890.....	5,000.00
July 13, 1892.....	5,000.00
Aug. 18, 1894.....	4,000.00
June 3, 1896.....	2,000.00
Mar. 3, 1899, for lock and dam.....	50,000.00
June 6, 1900, for lock and dam.....	100,000.00
Mar. 3, 1901, for lock and dam.....	50,000.00
June 28, 1902, \$25,000 for lock and dam.....	50,000.00
June 13, 1902 (allotment Oct. 29, 1902).....	5,000.00
Mar. 2, 1907 (allotment June 15, 1907).....	67,000.00
Mar. 2, 1907 (allotment Nov. 10, 1908).....	5,000.00
Mar. 2, 1907 (allotment Nov. 12, 1908).....	5,125.00
Mar. 2, 1907 (allotment Feb. 17, 1909).....	¹ 1,022.50
Mar. 3, 1909 (allotment Apr. 5, 1909).....	28,100.00
June 25, 1910 (allotment July 16, 1910).....	79,000.00
Feb. 27, 1911 (allotment Mar. 15, 1911).....	38,051.14
July 25, 1912 (allotment Aug. 2, 1912).....	43,000.00
Mar. 4, 1913 (allotments Mar. 31, 1913, and Aug. 18, 1914).....	35,000.00
Oct. 2, 1914 (allotment Oct. 7, 1914).....	18,000.00
Mar. 4, 1915 (allotment Apr. 1, 1915).....	15,000.00
Mar. 4, 1913 (allotment Jan. 22, 1916).....	10,000.00
July 27, 1916 (allotment Sept. 1, 1916).....	40,000.00

Total of appropriations and allotments.....	668,298.64
Receipts from miscellaneous sources.....	1,745.83
Grand total.....	670,044.47

COMMERCIAL STATISTICS.

(Jan. 1, 1915, to Dec. 31, 1915.)

Freight traffic.

Articles.	Short tons.	Value.
Cotton, short.....	140	\$29,000
Cotton goods.....	20	18,000
Fertilizer.....	460	115,000
Dry goods, clothing, etc.....	75	120,000
Groceries, canned goods, provisions.....	1,020	122,910
Hardware, manufactured iron, etc.....	950	85,400
Oils and paints.....	530	61,000
Whisky, wine, and beer.....	4	1,250
Miscellaneous.....	790	100,000
Lumber, staves, etc.....	325	3,000
Total.....	4,324	656,560

Practically all the commerce on this river was conducted by one old stern-wheel steamer of 133 registered net tons, making 86 round trips via Congaree and Santee Rivers from Columbia and Georgetown.

¹ Allotment of \$1,800, of which \$777.50 was returned to Treasury.

6. OPERATING AND CARE OF LOCK AND DAM ACROSS CONGAREE RIVER NEAR COLUMBIA, S. C.

This lock and dam is located on the Congaree River, 2 miles below Columbia, S. C., 49 miles about the mouth of the river. The dam was up and the lock in commission from November, 1915, since which date the Columbia Railway & Navigation Co. has operated from its terminals at the foot of Senate Street.

The work during the year comprised the general care and operation of the lock and dam, routine repair work, and the care and improvement of the grounds. All work was done by the regular lock force with Government plant.

The distribution of expenditures for the year was:

Salaries and wages of regular hired-labor force.....	\$4, 452. 21
Miscellaneous repairs.....	284. 87
Miscellaneous supplies and services.....	1, 606. 30
Contingencies.....	118. 00
Total.....	6, 411. 38

Total expenditures incurred in each fiscal year.

1906.....	\$881. 27	1913.....	8, 921. 91
1907.....	4, 618. 73	1914.....	8, 980. 97
1908.....	5, 308. 51	1915.....	9, 479. 80
1909.....	10, 480. 68	1916.....	6, 411. 38
1910.....	6, 325. 88		
1911.....	4, 892. 25	Total.....	77, 917. 74
1912.....	11, 621. 86		

COMMERCIAL STATISTICS.*Lockages made through the lock on Congaree River near Columbia, S. C.*

Steamboats.....	48
Motor boats.....	4
Total lockages.....	52

Freight traffic.

It has not been practicable to collect commercial statistics for the few weeks during which the lock was open for traffic.

7. INLAND WATERWAYS BETWEEN CHARLESTON HARBOR, S. C., AND ALLIGATOR CREEK (OPPOSITE MCCLELLANVILLE), S. C.

No funds were available and no work was done.

APPROPRIATIONS.

June 13, 1902.....	\$50, 000
Mar. 2, 1907.....	75, 290
Mar. 3, 1909 (allotment Apr. 7, 1909).....	5, 000
June 25, 1910.....	25, 000
Feb. 27, 1911.....	41, 000
July 25, 1912.....	15, 000

Mar. 4, 1913.....	\$25, 000
July 27, 1916.....	15, 000
Total.....	251, 290
Transferred under river and harbor act Mar. 4, 1915, to Winyah Bay, S. C.....	36, 600
Net total.....	214, 690

COMMERCIAL STATISTICS.

[Jan. 1 to Dec. 31, 1915.]

Freight traffic.

Articles.	Short tons.	Value.
TOWARD M'CLELLANVILLE.		
Brick.....	514	\$3, 406
Cement.....	255	3, '96
Coal.....	354	2, 478
Cotton seed, hulls and meal.....	445	13, 291
Fertilizer.....	501	16, 811
Gasoline.....	112	5, 591
Grain.....	111	8, 800
Hay.....	538	10, 730
Kerosene.....	2 0	5, 745
Lumber.....	12	120
Lime.....	49	3 35
Machinery.....	104	52, 010
Oysters.....	517	1, 925
Potatoes.....	160	16, 000
Salt.....	21	212
Soft drinks.....	23	920
Shingles.....	4	80
Miscellaneous general merchandise.....	760	76, 000
Total.....	4, 769	216, 677
FROM M'CLELLANVILLE.		
Cattle.....	77	6, 755
Cotton, sea island.....	178	53, 550
Cotton, upland.....	163	32, 600
Croseties.....	16	120
Eggs.....	13	1, 012
Fish, fresh.....	131	3, 060
Hogs.....	49	4, 900
Lumber.....	1, 220	7, 423
Oysters.....	284	3, 940
Oysters, canned.....	358	26, 850
Oyster shells.....	260	650
Poultry.....	16	406
Potatoes.....	51	5, 140
Rice, rough.....	23	950
Rosin.....	175	3, 510
Turpentine, spirits.....	29	5, 145
Tar.....	4	56
Timber.....	170	850
Vegetables.....	677	36, 100
Wood.....	1, 762	2, 643
Watermelons.....	28	560
Miscellaneous general merchandise.....	260	12, 515
Total.....	6, 049	208, 630
Total both ways.....	10, 818	425, 307

Average haul, or distance freight was carried, 40 miles.

Rate per ton-mile, package rates.

The above is not complete. The commerce is handled in small boats the owners of which keep no records, and reliable commercial statistics can therefore not be obtained.

The territory served by this waterway is in a transitional stage. The lumber which might be hauled by water has been cut out or is handled by a logging railroad built into the back country. The oyster canning industry is already worked out. The farmers are turning to truck farming and require the waterway to be improved by deepening and straightening.

8. CHARLESTON HARBOR, S. C. (INCLUDING ASHLEY RIVER).

(A) CHARLESTON HARBOR.

No dredging was done because the available funds were not sufficient for advantageous and economical use.

The U. S. dredge *Sumter* was returned to this district from the Jacksonville and Savannah districts, July 13, 1915, and has since been laid up in the harbor with a skeleton crew.

For purposes of record and comparison surveys have been made from time to time, and a very complete and careful survey of the entrance bar was made on suitable dates in April, May, and June. This survey with previous surveys made in July, 1913, and February, 1915, furnish data for study of general changes and particularly as to nature and rate of shoaling during the suspension of dredging, no work whatever having been done since May 29, 1914.

On account of misapprehension and repeated mis-statements as to conditions at the entrance of Charleston Harbor the following information based on a study made by United States Assistant Engineer James P. Allen, of this office, is inserted here with a view to publication in an official document.

Opposite the end of the north jetty and 1,000 feet distant there is a shoal which encroaches on the channel, though not to the same extent as in 1913. This shoal was dredged in 1914, 253,077 cubic yards having been removed. At present the 28-foot contour (project depth) is only about 150 feet north of the lighted range, but there is at this point, nevertheless, a width of 600 feet which is over 28 feet deep at mean low water. On June 14, 1916, the *Curaca* entering the harbor with a valuable cargo on a draft of 29 feet grounded on this shoal. The accident was due to the vessel giving way to a faster vessel which overhauled the *Curaca* and signaled to pass on her port side. The *Curaca* could have kept the lighted range and still there would have been room on the port side for the faster boat. Excepting this shoal the channel has project width and depth for 3,500 feet beyond the jetties.

The outer shoals lying to the northeast and southwest of this channel are somewhat reduced in area. This is more distinctly true on the southwest side, where there seems to be a tendency for some of the water ejected from the jetties to pass off southward during ebb tide. The outward movement of material continues, but at a much slower rate than formerly. Shoals apparently form, move outward, diminish in area, and disappear, to be followed in time by other shoal formations passing over the same ground. The indications are that very little material now comes out of the jetty opening.

The surveys of February, 1915, and April-June, 1916, have been compared by calculating mean soundings in a system of small squares, 250 feet on a side, which have been plotted in the channel area, as shown on accompanying map.

The numbers in the various squares represent the change in depth, + indicating shoaling and - indicating scour. It will be noted that the squares on the extreme northeast side of the channel show the greatest amount of shoaling, and of these the seven squares showing the greatest fill are those directly opposite the shoalest water lying to the northeast of the channel. The seven

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 26.8 26.0 26.7 26.6
 6.4 26.9
 6.7 26.7 26.2 26.2

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 22.6 23.4 25.6 23.0 1

 6 22.5 22.9 23.4 24.5 24
 7.3 23.2 23.5 25.4 26
 23.6 23.0 24.4 25.3 2

 22.8 24.1 26.2 25.0 26
 24.8 26.0 27.3 26.8
 27.2 27.5 27.0
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 26.3 26.9 26.9 26.9 26.1
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 26.2 26.9 26.5 26.5

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squares showing the next largest amount of fill are A1 to A7, which lie partly opposite the shoal and partly opposite the entrance to the eastern channel. From these squares outward the fill gradually diminishes. These facts seem to prove that the material enters the channel from the northeast under the action of waves from that direction. The squares on either side of the center line confirm this deduction, the fill gradually diminishing as the locality is farther removed from the shoal. Furthermore, the fill diminishes toward the outer end of the channel, which is explained by the fact that with reference to the wave and current action from the northeast the shoals have been passed and the tide carries but little material out so far. While over 400,000 cubic yards of shoaling (place measurement) is shown to have occurred, only a small portion of it injures the channel, as based on a project depth of 28 feet; most of this material is in "overdepth" water and will not require removal.

The following is deduced from the above-mentioned study:

(a) The channel as a whole has shoaled during the suspension of dredging operations.

(b) Most, if not all, of the material deposited in the channel has been fed in from the northeast shoal.

(c) The material moves across the channel and a relatively small portion moves out or in parallel to the range.

(d) The southwest shoal exerts little or no harmful influence upon the channel, and indeed may act beneficially as a training wall.

Under existing conditions to complete the channel and secure project dimensions will require the removal of about 177,000 cubic yards place measurement. As this dredging will be confined to small areas there will be, due to mechanical difficulties and inaccuracies, a great deal of excess dredging, and by bin measurements the excavation may readily approximate 500,000 cubic yards, which represents seven months' work by the dredge *Sumter*.

The practical question, however, is not so much the completion of the channel as its maintenance after completion. As stated above, a comparison of the surveys of February, 1915, and April, 1916, shows a deterioration of over 400,000 cubic yards in a period of 14 months. Maintenance will therefore be necessary and dredging must be kept up almost continuously if the depth of 28 feet at mean low water and the width of 1,000 feet is to be assured. Funds should therefore be provided annually in order that commerce may count on reasonably fixed conditions at this port.

APPROPRIATIONS.

CHARLESTON HARBOR PROPER.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 422)		\$4,825,200.00
Existing project:		
June 25, 1910	\$150,000.00	
Feb. 27, 1911	100,000.00	
July 25, 1912	50,000.00	
Mar. 4, 1913	71,616.00	
Mar. 4, 1915 (allotment Apr. 2, 1915)	5,150.00	
July 27, 1916	70,000.00	
		446,766.00
Total		5,271,966.00
Received for rent, use, and care of dredge, and account sales		45,119.88
Grand total		5,317,085.88

COMMERCIAL STATISTICS.

PORT OF CHARLESTON, S. C.

[Calendar year 1915.]

The regular lines of steamships established between this port and New York, Boston, Jacksonville, Baltimore, and Georgetown comprise a total of 10 steamers. During the calendar year 1915, 8 of these ran to the three first-named ports and 2 to the remaining two, carrying a total of 1,688,382 short tons of freight, valued at \$198,809,420, and 30,641 passengers.

A freight service is maintained more or less irregularly between Charleston and the principal ports of the United Kingdom and Continent of Europe, and in addition there is a large fleet of American coastwise sailing vessels and barges operating between this and northern ports.

There are several hundred small steamers and gasoline boats plying between Charleston and adjacent towns and plantations. From best information obtainable, during the year 1915 this portion of the commerce amounted to 155,904 tons, valued at \$2,891,487.

During the fall of 1915 the Southern Railway Co. completed a large coal-handling pier with device for the rapid handling of coal from cars to vessels. This plant, which dumps carloads bodily into a hopper, has a capacity of 2,500 tons (twenty-five 100-ton cars) per hour. The business handled by this pier for the short period in 1915 shows an immense prospective business of exportation of large cargoes of coal, requiring deep-draft vessels.

The chief articles of import and export were: Fertilizer materials, valued at \$5,667,413; fruit, \$21,313; coal, \$363,985; petroleum products, \$1,490,035; sugar, \$2,796,480; cotton \$16,964,200; cotton fabrics, \$12,609,000; cottonseed cake, \$622,334; lumber, \$1,314,630; rice, \$135,000. The total amount of freight received and shipped at the port during the year 1915 was 2,314,259 short tons, valued at \$222,881,814. This includes cargoes entering the harbor though consigned to ports beyond.

In collecting statistics for this report information has been obtained from primary sources mainly.

[Jan. 1, 1915, to Dec. 31, 1915.]

Freight traffic.

Articles.	Short tons.	Value.
INBOUND TRAFFIC.		
Foreign imports:		
Agricultural implements.....	14	\$1,342
Fertilizer materials.....	4,633	125,361
Fruit.....	1,639	21,313
Guano.....	73	37,015
Liquors, wines, etc.....	12	357
Machinery.....	5	1,554
Manure salts.....	56	840
Miscellaneous.....	1,196	48,906
Muriate of potash.....	5,019	200,760
Nitrate of soda.....	42,125	2,527,500
Ore.....	72,801	562,408
Sulphate of ammonia.....	1,912	123,840
Salt.....	10	1,541
Sulphate of potash.....	115	5,750
Tobacco, cigars, etc.....	2	3,415
Total.....	130,242	3,691,892
Coastwise:		
Bagging.....	17,259	172,500
Canned goods.....	25,790	3,967,000
Cement, lime, etc.....	23,990	287,880
Coal.....	40,572	202,880
Fertilizer materials.....	34,673	367,006
Miscellaneous.....	66,968	6,615,646
Petroleum products.....	58,020	1,049,329
Salt.....	6,632	265,280
Sugar.....	22,554	2,706,480
Total.....	291,439	16,028,981
Grand total.....	421,681	19,715,873

Freight traffic—Continued.

Articles.	Short tons.	Value.
Exports:		
OUTBOUND TRAFFIC.		
Coal.....	6,812	\$19,587
Cotton.....	63,437	12,485,400
Cottonseed cake.....	25,084	622,334
Fertilizer, manufactured.....	6,037	112,049
Lumber.....	1,454	14,540
Miscellaneous.....	243	24,300
Total.....	101,757	13,378,100
Coastwise:		
Boots and shoes.....	56	67,200
Bran.....	79	2,370
Canned goods.....	44	7,040
Clay.....	9,650	99,650
Coal.....	7,036	141,688
Cotton, sea island.....	875	405,000
Cotton, upland.....	20,349	4,073,800
Cotton goods.....	14,010	12,608,000
Cottonseed, hulls and meal.....	1,975	58,250
Fertilizer, manipulated.....	2,000	40,000
Live stock.....	20	20,000
Lumber, logs, and forest products.....	128,359	1,283,590
Machinery (wires).....	19	40,000
Miscellaneous.....	25,334	2,533,400
Naval stores.....	220	13,200
Petroleum products.....	405	3,810
Pig iron.....	20	240
Rice.....	900	135,000
Total.....	241,400	21,604,138
Grand total.....	343,217	34,782,298

Internal traffic—Small boats in harbor.

Articles.	From Charleston, S. C.	To Charles- ton, S. C.	Value.
	Tons.	Tons.	
Brick.....	908		\$3,520
Cattle.....	114	713	43,646
Cement.....	598		7,234
Coal.....	1,283		8,167
Cotton, sea island.....		950	327,035
Cotton, upland.....		1,233	261,125
Cottonseed, hulls and meal.....	1,306	934	60,838
Clams.....		100	60
Cross-ties.....		16	120
Eggs.....		43	4,091
Fertilizer.....	5,277		167,410
Fish, fresh.....		131	31,363
Gasoline.....	212		12,035
Grain.....	787		38,263
Hay.....	1,325	50	27,500
Hogs.....	16	99	11,075
Horses.....	196	132	84,665
Kerosene.....	624		19,087
Lumber.....	4,255		39,388
Lime.....	185		1,483
Machinery.....	317		17,700
Nuts, pecan.....		33	12,538
Oysters, canned.....		413	30,200
Poultry.....		20	12,580
Peanuts.....	7	2	838
Potatoes.....	88	1,662	143,283
Rice, rough.....	72	2,652	90,798
Rosin.....		538	11,912
Salt.....	103		1,286
Soft drinks.....	850		34,199
Shingles.....	74		1,082
Turpentine, spirits.....		65	1,950
Tar.....		16	307
Timber.....	6	91,544	470,012
Vegetables.....		5,816	245,470
Wood.....		8,832	18,435
Watermelons.....		100	2,082
Miscellaneous general merchandise.....	14,650	2,215	636,490
Total.....	32,624	123,280	2,891,487
Total internal.....		155,904	2,891,487

Total traffic for the port proper, 920,802 tons; value, \$57,394,658.

Cargoes in and out of harbor consigned to ports beyond.

Articles.	Short tons.	Value.
Nitrate of soda.....	6,517	\$391,020
Sulphate of ammonia.....	1,378	90,110
Petroleum products.....	5,084	218,448
Miscellaneous.....	688,730	82,088,000
Total.....	696,724	82,742,578

Summary.

	Short tons.	Value.
Inbound:		
Foreign—		
Landed.....	130,242	\$3,691,892
Ports beyond.....	7,890	487,130
Coastwise—		
Landed.....	291,439	16,023,981
Ports beyond.....	688,834	82,266,448
Internal traffic.....	123,280	1,911,318
Outbound:		
Foreign, loaded.....	101,757	13,278,180
Coastwise—		
Loaded.....	241,460	21,504,138
Ports beyond.....	696,724	82,743,578
Internal traffic.....	32,624	985,169
Total.....	2,314,260	222,881,814

Vessel classification.

	Arrived.			Departed.		
	Number.	Tons.	Crew.	Number.	Tons.	Crew.
Coastwise:						
Foreign vessels.....				1	2,300	24
American vessels.....	7,072	1,734,195	20,695	7,070	1,730,400	20,646
Foreign ports: Foreign vessels.....	70	131,509	1,050	70	131,509	1,050
Total.....	7,142	1,875,704	21,745	7,141	1,865,109	21,720

Greatest draft: Arrived, 20 feet; departed, 20 feet. Duties collected, \$4,702.74.

(B) ASHLEY RIVER, S. C.

Under a contract dated April 5, 1915, with Simons-Mayrant Co., of Charleston, S. C., dredging of shoal places was begun April 28, 1915, and was completed during the fiscal year. The dredging, all of which was maintenance, was mainly on the north side of the channel between Imperial Wharf and a point about 700 feet above the Standard Wharf; the length of the cut is about 2,400 feet. The amount of material (sand and mud) removed during the fiscal year was \$53,970 cubic yards, all of which was removed between the points stated above. The depth obtained was 20 feet at mean low water and 240 feet wide. The dredged material was disposed of through a pipe line and deposited on the marshes and in low places on lands owned and controlled by the Virginia-Carolina Chemical Co., at Charleston, S. C., the permission of company having been obtained

for same. The plant employed by the contractors is a 12-inch hydraulic pipe-line dredge known as dredge *Sewee*, non-propelling, 75 feet long, 32-foot beam, 7 feet deep, 4-foot draft, with Morris pump and pumping engine. The price paid was 12½ cents per cubic yard, place measurement, and 6½ cents per cubic yard for overdepth dredging. The total expenses were \$8,418.25, all of which was for maintenance, divided as follows:

Removing 53,970 cubic yards.....	\$6,182.89
Surveys and inspection.....	1,787.04
Charleston office expenses.....	448.82
Total.....	8,418.25

The cost per cubic yard was therefore 15.6 cents.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 401)...	\$5,500.00
Existing project:	
July 25, 1912.....	\$51,150.00
Oct. 2, 1914 (allotment, Oct. 7, 1914).....	15,000.00
July 27, 1916.....	10,000.00
	76,150.00
Total.....	81,650.00
Receipts from sales.....	2.50
Grand total.....	81,652.50

CONTRACT IN FORCE.

Contractor: Simons-Mayrant Co., Charleston, S. C.
 Character and amount of work: Dredging, 55,000 cubic yards.
 Unit price: 12½ cents per cubic yard, place measurement, and 6½ cents per cubic yard for overdepth dredging.
 Date of approval: April 14, 1915.
 Date fixed for commencement: June 21, 1915.
 Date of actual commencement: April 28, 1915.
 Date fixed for completion: September 12, 1915.
 Completed: October 20, 1915.

COMMERCIAL STATISTICS.

Included in statistics for Charleston Harbor, S. C.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SAVANNAH, GA., DISTRICT.

REPORT OF MAJ. G. A. YOUNGBERG, CORPS OF ENGINEERS.

IMPROVEMENTS.

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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 626 TO 672.

1. SAVANNAH HARBOR, GA.

Work during the fiscal year has been confined entirely to the 26-foot project. The raising of oyster-bed training wall under contract was continued, 19,947.67 cubic yards of stone being placed, completing 3,900 linear feet of wall. There was expended on this work \$57,119.04.

The remaining work was dredging and incidental work connected therewith, for which was expended \$248,883.52.

The seagoing dredge *Cumberland* has worked 11 months, the seagoing dredge *Savannah* 4 months, and the pipe-line dredge *Morgan* 12 months in the harbor. The performance at various localities is given below:

Dredging by Government dredges.

(Cubic yards.)

Locality.	Savannah.	Cumberland.	Morgan initial dredging.		
			Down to 27 feet.	Below 27 feet.	Behandling.
Bar.....	181,157	196,947			
Tybee Roads.....	36,604	235,616			
Tybee Knoll.....	60,490	355,751			
Lower flats.....	26,533	16,190			
Upper flats.....	280	108,020	262,992	100,964	
Red Light dump ground.....					602,785
Wrecks Channel.....			167,667	63,140	
City front.....			164,637	74,140	
Obstructions.....			77,037	40,407	
Total.....	265,371	907,524	662,833	278,641	602,785
Total cost, including ordinary and extraordinary repairs.....	\$24,193.18	\$76,000.13	\$869,432.50		\$41,008.80
Unit cost per cubic yard (cents).....	9.474	8.381	7.457		6.911

¹ Includes all yardage and cost of new steel barges.

Of the above dredging none has been effective in the accomplishment of the improvement, and 2,093,769 cubic yards was for maintenance.

The U. S. snag boat *Tugaloo* removed the stubs of 17 old mooring piles in Red Light dump ground, for which was expended \$1,107.17.

Dredging by private parties in slips and in front of their terminals.

	Cubic yards.
Seaboard Air Line Ry.....	30, 328
Central of Georgia Ry.....	47, 990
Virginia-Carolina Chemical Co.....	9, 897
Atlantic Coast Line R. R.....	18, 610
Kehoe Iron Works.....	1, 625
Total.....	108, 448

Substantial side ranges with targets have been placed on five of the main channels being improved by dredging, and also on the dump grounds for use of the seagoing dredges.

The water front of the property rented for mooring purposes on Hutchinson Island, was practically cleared of wrecks and old timbers. Two mud scows, one small two-masted schooner, six tugboats, two boilers, seven logs, and a good many raft oars and binders were taken up and disposed of in Old Back River. The front of the property was dredged to a depth of about 15 feet at mean low water, 19,527 cubic yards being removed, in addition to a large amount of trash and logs. The work was completed in December, 1915. A small wharf and approach, with mooring dolphins, to take care of the U. S. dredge *Savannah* and other plant while laid up, was constructed in front of this property. There was expended on this work \$3,283.63, which is included in the expenditures for incidentals.

A study of the results of the annual survey and of the records of work done shows that during the year there has been a net (balancing scours against the fill) deposit of 2,592,316 cubic yards of material within the limits of the channel proper, including side slopes, and that 2,365,000 cubic yards must yet be removed to obtain project dimensions throughout the harbor, exclusive of any material which may be brought down by the river while the work is in progress. As compared with conditions at the close of the preceding year, there has been a net loss or retrogression of 514,000 cubic yards; or, in other words, notwithstanding that 2,093,769 cubic yards of material has actually been removed from the channel during the year, 514,000 more remains to be removed now than at this time in 1915. Conditions as to flow during the year have not been abnormal and, in the absence of reasons to the contrary, it may be safely assumed that the shoaling for the coming year will be equal to that for the past year. On this hypothesis, to accomplish the project by June 30, 1917, the dredges will be forced to remove the deficiency now existing, amounting to 2,365,000 cubic yards, plus the anticipated annual deposit of 2,592,000 cubic yards, or 4,957,000 cubic yards. This is practically 2,000,000 cubic yards in excess of the combined capacity of the three dredges available, even if it be assumed that ample funds are provided to permit of full-time operation throughout the year, and that one of the seagoing dredges will not be required elsewhere in the district, a contingency which is quite probable. The rate of shoaling is steadily increasing, as shown by the following table:

Annual shoaling, Savannah Harbor.

Year.	Net fill.	Mean for preceding years.	Year.	Net fill.	Mean for preceding years.
	<i>Cubic yds.</i>	<i>Cubic yds.</i>		<i>Cubic yds.</i>	<i>Cubic yds.</i>
1907.....	260,000	.....	1912.....	.....	521,000
1908.....	260,000	.....	1913.....	965,000	763,000
1909.....	260,000	.....	1914.....	1,373,000	873,000
1910.....	737,000	.....	1915.....	1,714,000	996,000
1911.....	960,000	.....	1916.....	2,592,000	1,154,000

	Dredging.	Training wall.	Construction dredge Morgan.	Contingencies.	Removal of refractory material.	Unallotted.	Total.
Percentage of total estimate allowed for the various items:							
21-foot project.....	90.0	.....	.....	10.0	.....	.....	100.0
26-foot project.....	73.0	11.5	5.5	9.0	1.0	.....	100.0
Percentage expended on original work up to June 30, 1916, for the various items:							
21-foot project.....	53.4	.....	.....	4.7	.....	.....	58.1
26-foot project.....	41.2	11.5	6.0	10.0	2.3	.....	71.0
Work accomplished in percentage of original work estimated to be done:							
21-foot project.....	47.0	.....	.....	3.0	.....	.....	50.0
26-foot project.....	60.0	11.5	5.5	8.0	.9	.....	85.9

¹ Approximately.

The amount expended to June 30, 1916, in accomplishing the above was \$1,807,917.37. The amount that has been made available to accomplish the 26-foot project up to June 30, 1916, not including maintenance, was \$2,545,000, showing that 71 per cent of the revised estimated cost has been expended up to June 30, 1916, in accomplishing 85.9 per cent of the project.

The channel in general throughout the harbor is in a slightly less satisfactory condition than it was at the date of the last annual report. For 67 per cent of the improved 26-foot channel as compared to 87.3 per cent last year, the navigable depth is 26 feet or more and the average depth is 27 feet, the same as last year. At five localities there is found less than 26 feet, the minimum usable depth of the harbor being 22 feet, found on "lower flats."

Upon December 30, 1915, \$4,000 was deposited with the United States Treasury to the credit of Savannah Harbor by the attorneys for the steamship *Frankdale* on account of damages to U. S. dredge *Morgan*. (Annual Report for 1915, p. 2411.)

Amount expended during the fiscal year ending June 30, 1916, for 26-foot project, \$306,002.56, in detail as follows:

Removing obstructions and erection of mooring wharf by U. S. boats <i>Tugaloo</i> , <i>Augusta</i> , and pile driver.....	\$4,390.80
Dredging by <i>Morgan</i>	111,075.89
Dredging by <i>Cumberland</i>	76,080.13
Dredging by <i>Savannah</i>	24,193.18
Contract with R. S. Salas, raising oyster-bed training wall.....	57,119.04
Operations and repairs to inspection boats.....	7,643.29
Payments under employee liability act.....	64.50
Office expenses, survey, and contingencies.....	25,455.73
Amount expended during fiscal year ending June 30, 1915, for 21-foot project.....	0.00

Total expended, Savannah Harbor..... 306,002.56

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 552)	\$7,768,563.58
Less amount of project expended for steamboat channel between Savannah, Ga., and Beaufort, S. C.	\$106,700.00
Less allotment of \$9,000 from emergency act of Mar. 3, 1905	9,000.00
	115,700.00
Total	7,652,863.58
Present project:	
Mar. 2, 1907 (river and harbor act)	300,000.00
May 27, 1908 (sundry civil act)	300,000.00
Mar. 4, 1909 (sundry civil act)	400,000.00
June 25, 1910 (river and harbor act)	400,000.00
Feb. 27, 1911 (river and harbor act)	400,000.00
July 25, 1912 (river and harbor act)	400,000.00
July 25, 1912 (river and harbor act)	140,000.00
Mar. 4, 1913 (river and harbor act)	345,000.00
Oct. 2, 1914 (river and harbor act)	150,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915, from river and harbor act)	185,000.00
July 27, 1916	545,000.00
Total	11,217,863.58
Contributed funds: Aug. 30, 1915, by Georgia-Carolina Ferry Co.	500.00
Total	11,218,363.58
Received from other sources previously reported	2,863.12
Grand total	11,221,226.70

CONTRACT IN FORCE.

Contractor: R. S. Salas, Savannah, Ga.
 Date of contract: March 18, 1915.
 Character and amount of work: Raising of stone jetty, 40,000 tons.
 Unit price: \$1.00 per ton, furnished in place.
 Date of approval: March 24, 1915.
 Date fixed for beginning work: May 13, 1915.
 Date of actually beginning work: May 12, 1915.
 Date fixed for completion: January 29, 1916.
 Date of actual completion: September 9, 1915.

COMMERCIAL STATISTICS.

The regular line of steamships established between this port and New York, Boston, Philadelphia, and Jacksonville comprises a total of 15 steamers. During the calendar year 1915, 9 of these ran to the first two ports and 6 to the last three. During the year they carried 1,267,079 short tons of freight, valued at \$339,622,683. They also handled in and out of Savannah 52,374 passengers.

A regular steamboat service is maintained on the Savannah River between Savannah and Augusta, Ga., a distance of 202 miles; a regular freight service is maintained between Savannah and the principal ports of the United Kingdom and the Continent of Europe, and in addition there is a fleet of American coastwise sailing vessels which operate between Savannah and northern ports. Total amount of freight carried by coastwise sailing vessels amounted to 209,762 short tons, valued at \$1,146,526.

The Central of Georgia Railway Co. has constructed terminals costing about \$1,000,000, which are used by the Ocean Steamship Co. These terminals were completed June 3, 1916.

On the inland waters there are a number of small steamers plying between Savannah and adjacent ports, besides numerous schooners, launches, and small sailboats. It is estimated that for the year 1915 this portion of the commerce amounted to 397,436 short tons, valued at \$7,554,295. A total of 50,555 local passengers were handled in and out of Savannah during the year.

There is reported 75,281 tons of merchandise handled between Savannah and terminals across the river on Hutchinson Island, which is not included in the report of commerce.

The commerce for the calendar year 1915 was as follows:

	Received.		Shipped.	
	Short tons.	Value.	Short tons.	Value.
FOREIGN.				
Lumber and lumber products.....			56,642	\$930,069
Cotton and linters.....			302,207	52,787,280
Naval stores.....			56,235	2,783,461
Cottonseed meal and cake.....			221,386	5,407,264
Iron and steel.....			78,509	1,176,845
Salts.....	48,175	\$1,414,109		
Pyrites.....	54,600	233,778		
Miscellaneous.....	1,222	616,194	3,033	1,517,814
Total.....	104,007	2,264,061	718,012	64,599,743
COASTWISE.				
Cotton and linters.....			128,497	22,779,040
Canned goods.....	15,857	1,074,990	5,426	628,875
Fertilizer.....	80,355	771,530		
Hay and grain.....	17,761	621,284	9,891	306,912
Iron and steel.....	62,368	2,494,720	59,760	1,166,862
Lumber and cross-ties.....			324,279	2,868,665
Naval stores.....			92,329	4,475,861
Miscellaneous.....	530,956	199,828,993	394,007	106,662,463
Total.....	656,797	204,791,507	1,013,878	140,878,678
LOCAL.				
Cotton factory products.....	4,567	1,141,750	22	5,500
Fertilizer.....	5,558	94,876	4,061	83,063
Lumber and cross-ties.....	56,763	492,592	2,183	23,337
Oyster shell.....	16,197	41,279		
Sand.....	231,438	130,715	425	806
Miscellaneous.....	12,776	945,329	43,451	4,596,048
Total.....	347,294	2,846,541	50,142	4,707,754
Grand total.....	1,108,098	209,902,129	1,782,032	210,186,175

	Arrived.			Departed.		
	Number.	Tons.	Crew.	Number.	Tons.	Crew.
COASTWISE.						
Foreign vessels.....	80	163,875	2,307	46	101,535	1,433
American vessels.....	464	1,266,406	25,589	476	1,187,627	27,322
FOREIGN PORTS.						
Foreign vessels.....	182	320,503	4,860	219	395,491	5,215
American vessels.....	7	16,046	213	18	48,736	638
Total.....	733	1,766,830	32,969	759	1,733,389	34,608

Customhouse receipts for calendar year 1915, \$46,931.73.

Greatest draft: Arrived, 28 feet 2 inches; departed, 28 feet 4 inches.

It is estimated that 65 per cent of the entire tonnage of the harbor is carried by vessels drawing 19 feet and under.

2. SAVANNAH RIVER BELOW AUGUSTA, GA.

There was expended \$6,669.72 in carrying on snagging operations over the entire 201 miles of channel with the U. S. snag boat *Tugaloo* from November 1, 1915, to February 29, 1916, when she was laid up at Savannah on account of lack of funds. There were removed from the channel 2,124 snags and 179 stumps; 2,353 overhanging trees and 94 logs were cut from the banks.

There was expended \$122 in placing galvanized wire crossties on 6,100 linear feet of bank protection. The cost was \$0.02 per linear foot.

There was expended \$9,115.15 under contract in repairing 125 linear feet of bank protection at Upper Bluehouse and repairing and constructing 2,720 linear feet of bank protection and 285 linear feet of breaks at Canoe Cut and Tweedys Bar. There were used in this work one hundred and thirty-eight 35-foot piles, forty-four 30-foot piles, 5,387.22 cubic yards of brush, and 1,055.54 cubic yards of stone while 85 old piles were removed. This work was commenced December 1, 1915; suspended on account of high water December 19, 1915; resumed in April, 1916; and completed on the 20th of that month.

There was expended \$376.20 in establishing 33 permanent survey points and bench marks at intervals along the banks between Savannah and Augusta. The cost was \$11.40 per bench mark placed.

In order to determine the amount and occurrence of certain reported low-water fluctuations at Augusta, Ga., apparently due to the control of the flow by the Augusta Dam and Canal, an automatic tide gauge was installed at Center Street Bridge. A study of the gauge records was made and the results incorporated in the report on the survey of this waterway.

In addition to above \$2,573.50 was expended as a liability from fiscal year of 1915 on contract with A. J. Twiggs & Son under date of January 25, 1915, and \$2,376.18 in care of plant, contingencies, and office expenses, making a total of \$23,671.81.

APPROPRIATIONS.

Previous projects (H. Doc. No. 1491, 63d Cong., 3d sess., p. 552-553) — \$91,000.00

Existing project:

Sept. 19, 1890	\$25,000.00
July 13, 1892	35,000.00
Aug. 18, 1894	15,000.00
June 3, 1896	15,000.00
Mar. 3, 1899	20,000.00
June 6, 1900	64,000.00
Mar. 3, 1901	100,000.00
June 28, 1902	86,000.00
Apr. 28, 1904 (allotted Nov. 11, 1904, from emergency appropriation)	5,000.00
Mar. 3, 1905	13,000.00
Mar. 3, 1905 (allotted Nov. 24, 1906, from emergency appropriation)	2,000.00
Mar. 2, 1907 (river and harbor act)	30,000.00
Mar. 3, 1909 (allotted Mar. 22, 1909, from emergency appropriation)	25,000.00
Mar. 3, 1909 (allotted Dec. 28, 1909, from emergency appropriation)	4,000.00

Existing project—Continued.

June 25, 1910 (river and harbor act)-----	\$70,000.00
Feb. 27, 1911 (river and harbor act)-----	100,000.00
July 25, 1912 (river and harbor act)-----	105,000.00
Mar. 4, 1913 (river and harbor act)-----	125,000.00
Oct. 2, 1914 (river and harbor act)-----	15,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	15,000.00
July 27, 1916-----	29,000.00
	<u>\$898,000.00</u>
Total-----	989,000.00
Received from other sources previously reported-----	3,155.77
Grand total-----	<u>992,155.77</u>

CONTRACTS IN FORCE.

Contractor: A. J. Twigg & Sons, Augusta, Ga.

Character and amount of work, and unit prices: Furnishing and placing material for repairs to existing bank-protection work: 4,800 cubic yards of brush fascines, at 85 cents per cubic yard; 600 cubic yards of stone, at \$2.80 per cubic yard; 210 35-foot piles, at \$7.50 per pile; 80 30-foot piles, at \$7.25 per pile; 53 25-foot piles, at \$7 per pile; 110 old piling to be removed, at \$2.50 per pile; day labor replacing broken wire ties, or placing new ties, at \$1.75 per day.

Date of approval: Emergency contract; no approval.

Date of beginning work: December 1, 1915.

Date of completion: April 20, 1916.

Date fixed for completion: May 22, 1916.

Percentage completed at end of fiscal year: 100.

COMMERCIAL STATISTICS.

During the calendar year 1915 there were two steamboats and one twin-screw barge, propelled by producer-gas engines, operated on the river. One of the steamboats operated between Savannah and Burtons Ferry, a distance of 114 miles, and the other between Burtons Ferry and Augusta, a distance of 88 miles. The barge line is new, having been put on January 28, 1915, and operated over the entire length of the river up to the end of the year. It is reported that 1,419 passengers were carried over the river. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Cotton-factory products.....	4,589		928,978	\$1,147,250
Cotton seed.....	1,465		105,891	40,474
Cotton and linters.....	2,159		194,324	345,440
Fertilizer.....	2,391		162,870	61,476
Hay.....	1,089		85,150	27,225
Sugar.....	2,310		457,404	258,720
Miscellaneous.....	18,808		1,027,171	2,036,455
Total by boats.....	27,311		2,959,788	3,917,040
Lumber, rafted.....	26,328	12,665,414	1,594,191	227,745
Lumber, square.....	235	117,500	6,750	2,350
Grand total.....	52,874	12,782,914	4,560,729	4,147,135

In addition to the above, 17,565 tons of brush fascines, piling, and stone, valued at \$52,628, were handled over the river in connection with the Government contract work at Augusta.

3. SAVANNAH RIVER AT AUGUSTA, GA.

The work on the extension of the project of constructing bank protection under contract with A. J. Twiggs & Son, of Augusta, Ga., from Fifth Street to East Boundary Street, Augusta, Ga., was commenced May 25, 1914, and completed September 10, 1915. During the fiscal year the following work was accomplished:

Trench stone placed.....	tons..	50.4
Top pavement stone placed.....	do....	346.05
Road paving placed.....	square yards..	489.85
Bank protection completed.....	linear feet..	500

There was expended on this work \$12,058.76.

Under contract with Simons-Mayrant Co. the work of repairing the bank protection placed under the first project was done at an expenditure of \$18,782.01. This work consisted in making the bank protection at Hawks Gully conform to the new city levee, in repairing the revetment at the mouths of sewers which had been abandoned on account of the adoption of a new outlet sewer, and in raising the riprap at the foot of the paving up to grade at isolated points where it had settled. The amount of work of each class was as follows:

Excavation of trench.....	linear feet..	223.5
Trench stone placed.....	tons..	3,297
Subpavement placed.....	do.....	690.1
Top pavement placed.....	do.....	760.24
Placing top pavement furnished by the United States.....	do.....	492.59
Removing and replacing top pavement.....	square yards..	369.2

The total expenditure was \$30,840.77.

APPROPRIATIONS.

June 25, 1910 (river and harbor act).....	\$125,000
Mar. 4, 1913 (river and harbor act).....	60,000
July 27, 1916.....	33,000
Total.....	218,000
Amount contributed by the city of Augusta, Ga.....	185,000
Total.....	403,000

CONTRACTS IN FORCE.

Contractor: A. J. Twiggs & Son, Augusta, Ga.

Character and amount of work, with unit prices, stone bank protection: Excavation of trench, 11,000 cubic yards, at 60 cents per cubic yard; stone filling, 25,500 tons, at \$2 per ton of 2,000 pounds; subpavement, 4,500 tons, at \$2.50 per ton of 2,000 pounds; top pavement, 11,500 tons, at \$2.60 per ton of 2,000 pounds; roadway, 600 square yards, at \$3 per square yard, including base; wooden bulkhead, 500 linear feet, 462 piles, at \$24 per pile.

Date of approval: Emergency contract; no approval.

Date of commencement: May 25, 1914.

Date fixed for completion: June 21, 1915. (Time limit waived.)

Date of completion: September 10, 1915.

Percentage of completion at end of fiscal year: 100.

Contractor: Simons-Mayrant Co., Charleston, S. C.

Character and amount of work with unit prices, repairs to stone bank protection work: Excavation of trench, 250 linear feet, at \$5 per linear foot; stone

for repairs to trench, 3,000 tons, at \$2.90 per ton of 2,000 pounds; subpavement, 850 tons, at \$3.50 per ton of 2,000 pounds; top pavement, 750 tons, at \$3.90 per ton of 2,000 pounds; placing top pavement furnished by United States at Hawks Gully, 500 tons, at \$1.50 per ton of 2,000 pounds; removing and replacing top pavement, 450 square yards, at \$1.50 per square yard.

Date of approval: July 21, 1915.

Date of commencement: August 26, 1915.

Date of completion: December 18, 1915.

Percentage of completion at end of fiscal year: 100.

COMMERCIAL STATISTICS.

For commercial statistics see those for Savannah River below Augusta, Ga., as this work is for the improvement of that portion of the river.

4. SAVANNAH RIVER ABOVE AUGUSTA, GA.

There were no operations except inspections and the supervision of traffic and of the use of water by the power plants. There was expended on this work \$133.91.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 552) ----- \$39,000

Present project:

July 13, 1892	\$10,000
Aug. 18, 1894	6,000
June 3, 1896	3,000
Mar. 3, 1899	1,000
Mar. 3, 1905	2,000
Mar. 2, 1907	3,000
June 25, 1910	3,000
July 25, 1912	3,000
Mar. 4, 1913	8,470
	<hr/> 34,470
Total	73,470

COMMERCIAL STATISTICS.

The commerce over this waterway was continuous during the entire year. No regular scheduled boat line is operated, but numerous small boats of different structure make intermittent trips over the river from Augusta. The lock of the Georgia-Carolina Power Co. Dam at Stevens Creek was opened 192 times during the year. The commerce for the calendar year 1916 is shown, as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Cotton and lintens	225	.....	5,625	\$36,000
Fertilizer (manufactured)	207	.....	5,175	6,210
Groceries	7	.....	175	1,625
Crushed stone	6,000	.....	150,000	9,600
Lumber (square and round)	1,369	684,400	34,225	13,690
Miscellaneous	835	.....	20,875	10,057
Total	8,643	684,400	216,075	77,182

It is reported that 200 passengers were carried.

5. INLAND WATERWAY BETWEEN SAVANNAH, GA., AND BEAUFORT, S. C.

The U. S. pipe-line dredge *Augusta* redredged 7,505 linear feet of channel in Ramshorn Creek to a low-water depth of 7 feet and a width of 100 feet, commencing work August 2, 1915, and finishing October 22, 1915, removing 55,632 cubic yards of material, at an expenditure of \$3,163.60. The cost was \$0.0568 per cubic yard.

The U. S. snag boat *Tugaloo* removed a number of logs from Fields Cut, at an expenditure of \$228.31.

Quarters were built on the upper deck of the U. S. pipe-line dredge *Augusta*. This dredge then redredged 4,350 linear feet of channel in Fields Cut to a low-water depth of 7 feet, with a width of 80 feet, commencing work May 8 and finishing June 6, 1916, removing 34,307 cubic yards of material and 11 logs, at an expenditure of \$2,820.80, including repairs and changes in plant. The cost was \$0.0822 per cubic yard.

In addition, \$999.54 was expended for surveys and office expenses, making a total of \$7,212.25 expended.

APPROPRIATIONS.

Amounts included in Savannah Harbor, Ga.....	\$106,700.00
Mar. 3, 1905 (allotted Nov. 23, 1907).....	8,000.00
Mar. 3, 1905 (allotted June 6, 1908).....	1,000.00
Mar. 2, 1907 (allotted July 20, 1912).....	7,000.00
Mar. 4, 1913 (allotted Oct. 17, 1913).....	8.83
Mar. 4, 1913 (allotted Feb. 8, 1915).....	150.00
Mar. 4, 1915 (allotted April, 1915).....	5,000.00
Mar. 4, 1915 (allotted Feb. 19, 1916).....	3,000.00
July 27, 1916.....	2,500.00
Total.....	133,358.83

COMMERCIAL STATISTICS.

Three steamboats operate regularly over this waterway, two between Savannah and Beaufort and one between Savannah and Bluffton. Besides these small motor boats and tugs make intermittent trips over the waterway. The entire commerce of this waterway is carried on over the improved sections. The commerce for the calendar year was as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Cotton seed.....	1,047	.....	34,290	\$32,715
Canned goods.....	878	.....	27,498	87,800
Coal.....	3,386	.....	138,826	11,851
Fertilizer.....	6,214	.....	252,224	117,593
Lumber (square and round).....	6,316	3,053,625	92,120	41,109
Oyster shell.....	16,197	.....	450,475	41,279
Miscellaneous.....	28,458	.....	1,127,848	2,380,346
Total.....	62,496	3,053,625	2,123,281	2,712,693

It is reported that 44,174 passengers were carried. The report of passengers for the calendar year 1914 was ten times too great, the number being submitted as reported.

6. COWHEAD RIVER, GA.

There were no operations and no expenditures during the fiscal year.

APPROPRIATIONS.

July 25, 1912, river and harbor act.....	\$3,000.00
Mar. 6, 1913, funds contributed by local interests.....	2,445.79
Total	5,445.79

COMMERCIAL STATISTICS.

One small boat maintained a regular schedule during the summer season on this waterway. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Value.
Fish and oysters.....	82	\$11,780
Vegetables.....	72	4,500
Miscellaneous.....	329	18,100
Total.....	483	34,380

There were 2,650 passengers carried over this waterway. This commerce was mainly between Savannah and Tybee. Length of improvement is about one-fourth mile. It is reported that during the year 1915, about 150 gasoline launches in and around Savannah used this cut in going to and from Tybee Island.

7. SAPELO HARBOR, GA.

Owing to encroachments and shoaling occurring in the upper part of the improved harbor, redredging of 1,400 linear feet of channel with the U. S. dredge *Augusta* was necessary in July, 1915. There were removed 4,007 cubic yards of material, at an expenditure of \$1,059.28. The cost was \$0.264 per cubic yard.

For care and repair of other plant of district, contingencies, and office expenses \$621.11 was expended, making a total expenditure of \$1,680.39.

APPROPRIATIONS.

Present project:	
June 25, 1910.....	\$10,000
Feb. 27, 1911.....	11,000
Mar. 4, 1915 (allotment).....	2,000
Total.....	23,000

COMMERCIAL STATISTICS.

The commerce of this port consists entirely of lumber and timber brought in rafts and lighters over the inside waterway from Darien and shipped out by vessels using Sapelo entrance. The entire commerce is carried to the loading docks through Creighton Narrows, a recently improved part of the inside

¹ There was returned to town of Tybee an unexpended balance of \$554.21 from the original contribution of \$3,000.

waterway, and not by Mud River and Sapelo Sound as formerly. The commerce for the calendar year 1915 was as follows:

Lumber.	Feet b. m.	Short tons.	Value.
Foreign.....	2,830,000	5,660	\$46,695
Coastwise.....	1,000,000	2,000	12,260
Total.....	3,830,000	7,660	58,955

8. DARIEN HARBOR, GA.

There were no operations and no expenditures during the fiscal year.

APPROPRIATIONS.

Prior to existing project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 440)	\$173,865.96
Present project, July 27, 1916.....	4,000.00
Total.....	177,865.96

COMMERCIAL STATISTICS.

The commerce of Darien Harbor consists almost entirely of lumber. In the calendar year 1915, 32,071,723 feet of lumber, valued at \$538,626, was received at Darien in the form of rafts from the Altamaha River and then reshipped. The commerce for the year 1915 was as follows:

Shipments.	Short tons.	Lumber.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Coastwise over Doboy Bar.....	26,220	12,608,830	226,980	\$154,570
Coastwise by inside waterway:				
To Savannah for export.....	13,161	6,580,830	118,449	124,260
To Brunswick for export.....	9,539	4,769,403	85,851	93,140
To Brunswick for domestic shipment.....	21,651	10,481,807	194,859	145,370
To Sapelo for coastwise shipment.....	2,000	1,000,000	18,000	12,260
To Sapelo for export.....	5,660	2,830,000	50,940	46,695
Total shipment of lumber.....	77,231	38,261,920	695,079	576,295
Local shipments and receipts of merchandise by small steamers.....	3,142	.....	84,599	332,487
Grand total.....	80,373	38,261,920	779,678	908,782

Arrivals and clearances of vessels at the port of Darien, Ga., during the calendar year 1915.

[Furnished by the collector of customs.]

	Arrived.			Cleared.		
	Number.	Tons.	Crew.	Number.	Tons.	Crew.
Coastwise:						
Foreign vessels.....	1	1,220	22	.....	.....	.....
American vessels.....	2	1,317	16	1	336	7
Foreign ports:						
Foreign vessels.....	2	1,986	28	2	2,519	42
American vessels.....	.....	.....	.....	1	981	7
Total.....	5	4,523	66	4	3,836	56

¹ Amount of \$1,500 previously reported as having been received for Cumberland Sound omitted, being a reimbursable item.

9. ALTAMAHA, OCONEE, AND OCMULGEE RIVERS, GA.

(A) ALTAMAHA RIVER.

The work of constructing a closing dam in the cut-off known as Jacks Suck, commenced in February, 1915, was completed April 30, 1916. For this work the U. S. derrick boat *Sapelo* quarried, in the vicinity of Fall-in-Rock Bluff, 6,130 cubic yards of stone, which were taken to the dam and placed in it by the U. S. snag boat *Oconee*. In addition 2,514 cubic yards of rock were quarried on the Oconee River 2 miles above the forks, and towed to the dam by the *Oconee* and placed in it, making a total of 8,644 cubic yards used in constructing the dam to an elevation of 10 feet above low water and approximately 400 feet in length. The upper and lower ends of the dam were well connected with the banks, which were covered with stone to prevent erosion. About 42 cubic yards of spalls were used on the upper face of the dam to decrease the leakage through it. The dam cost \$2.123 per cubic yard. There was expended on the dam \$18,353.36. A drift catcher, made by driving piling spaced about 12 feet between centers, was placed across the suck below the dam to hasten the filling up of the old suck, the cost of which is included in above.

The U. S. dredge *Macon* continued work of dredging a channel 5 feet deep and 100 feet wide around Jacks Suck, removing 33,287 cubic yards of material, at a cost of \$0.163 per cubic yard, from 3,475 linear feet of channel. There was expended on this work, including the construction of a new hull for the tender of the *Macon*, \$3,796.26.

In addition to the foregoing \$2,786.98 was expended for contingencies and office expenses and \$34.50 was paid under the employee's liability act, making a total of \$24,971.10.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 396)..... \$203, 000. 00

Present project:

July 25, 1912 (allotted Sept. 3, 1912).....	\$9, 000. 00
July 25, 1912 (allotted Apr. 2, 1913).....	775. 00
Mar. 4, 1913 (allotted Dec. 28, 1913).....	4, 000. 00
Mar. 4, 1913 (allotted Feb. 20, 1914).....	4, 000. 00
Mar. 4, 1913 (allotted May 11, 1914).....	4, 000. 00
Oct. 2, 1914 (allotted Oct. 17, 1914).....	15, 000. 00
Mar. 4, 1915 (allotted Apr. 24, 1915).....	20, 000. 00
July 27, 1916 (allotted Aug. 21, 1916).....	10, 000. 00
	<hr/> 66, 775. 00

Total..... 269, 775. 00

Amount received from other sources, previously reported..... 176. 35

Grand total..... 269, 951. 35

COMMERCIAL STATISTICS.

There is in operation on this river one steamboat, which made during the year 64 trips from Doctortown to the forks, a distance of 77 miles. The new, self-propelled barge of the Macon-Atlantic Navigation Co. made 16 trips over the entire length of the river, 137 miles, during the last five months of the year. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Cotton and linters.....	673	.....	53,055	\$135,620
Croseties.....	2,014	.....	123,960	9,443
Cord wood.....	642	.....	22,470	1,284
Fertilizer.....	1,686	.....	56,010	43,150
Groceries.....	456	.....	15,960	63,840
Hardwood blocks.....	1,007	.....	77,749	13,226
Roain.....	1,461	.....	51,135	46,752
Sugar.....	202	.....	27,270	20,125
Turpentine.....	250	.....	8,750	32,750
Miscellaneous.....	370	.....	42,865	43,694
Total by boats.....	8,770	.....	482,244	409,884
Lumber by rafts and lighters.....	67,993	33,997,368	7,360,620	557,321
Grand total.....	76,763	33,997,368	7,842,864	967,205

Of the rafted and lightered lumber 15,844,035 feet board measure, valued at \$286,187, came from the Oconee, Ocmulgee, and Ohoopsee Rivers, the remainder originating on the Altamaha.

(B) OCONEE RIVER.

During October, 1915, a sand shoal at the mouth of the river was dredged by the *Macon*, 5,677 cubic yards of sand being removed from 605 feet of channel, at a cost of \$0.244 per cubic yard. There was expended on this work \$1,386.58.

From November 27, 1915, to February 20, 1916, the U. S. snag boat *Oconee* removed 707 snags and 59 stumps and cleared from the banks 366 overhanging trees and 13 logs, covering the channel for a distance of 30½ miles upstream, beginning at a point 80 miles from the mouth. During May and June the *Oconee* removed from the lower 71 miles of river 986 snags and 105 stumps, and cleared from the banks 45 overhanging trees and 19 logs. Some old wreckage near the boat landing at Dublin was removed, the cost of which is included in snag work. The lower 44 miles were cleared but not thoroughly snagged, as the navigation on this portion did not require it. There was expended on this work \$4,670.50. The cost of the work was \$2.03 per snag or other obstruction removed.

There was expended \$356.12 in quarrying 211 cubic yards of rock at Berry Hill for future use in the closing dam at Bonny Clabber Landing. The cost per cubic yard was \$1.69.

In addition to above \$120.68 has been expended for new plant, and \$1,009.84 for surveys, contingencies, and office expenses, making a total of \$7,543.72.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 512) - \$254,750.00
Present project:

July 25, 1912 (allotted Sept. 3, 1912)..... \$7,000

July 25, 1912 (allotted Apr. 2, 1913)..... 1,000

Mar. 4, 1913 (allotted Apr. 22, 1913)..... \$11,000

Less reallocation—

Mar. 4, 1913–Dec. 26, 1913..... \$2,000

Mar. 4, 1913–Feb. 20, 1914..... 4,000

Mar. 4, 1913–May 11, 1914..... 2,000

8,000

3,000

Present project—Continued.

Oct. 2, 1914 (allotted Oct. 17, 1914)-----	\$10,000
Mar. 4, 1915 (allotted Apr. 24, 1915)-----	10,000
July 27, 1916 (allotted Aug. 21, 1916)-----	20,000
	\$51,000.00
Total-----	805,750.00
Amounts received from other sources, previously reported-----	785.70
Grand total-----	306,515.70

COMMERCIAL STATISTICS.

Two steamboats operated on the Oconee River during the year 1915, neither of which ran on a regular schedule. One boat made 110 trips between Balls Ferry and Clarks Bluff, a distance of 86 miles. The other made 80 trips between Dublin and Bonny Clabber Landing, a distance of 28 miles. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Timber rafted.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Cotton and linters.....	285	.....	12,250	\$60,370
Crestles.....	640	.....	25,600	3,200
Fertilizer (manufactured).....	3,250	.....	119,500	80,500
General merchandise.....	289	.....	11,560	33,975
Naval stores.....	254	.....	10,200	9,180
Oak blocks.....	13,725	.....	92,850	63,450
Staves.....	1,462	.....	42,080	26,316
Total by steamboat.....	19,906	.....	314,040	278,991
Lumber rafted.....	22,019	11,004,906	792,130	207,100
Grand total.....	41,925	11,004,906	1,106,170	486,091

(C) OCMULGEE RIVER.

The U. S. derrick boat *Sapelo* has improved six rock shoals between mileage 148 and mileage 152½, removing 4,706 cubic yards of rock, 7,997 cubic yards of sand and clay, and 44 snags, in improving 3,605 linear feet of channel to a low-water depth of 4 feet with a width of 80 feet. A small amount of bank protection was constructed in the bight above one of the lower shoals. At two of the localities training walls and submerged dams for low-water control were constructed with the excavated material. This work was done at an expenditure of \$8,073.34. The cost per cubic yard of material removed was \$0.6355.

U. S. snag boat *No. 1* was transferred from Savannah to Macon, Ga., in July, 1915, and was engaged in snagging on the upper river to May 27, 1916, except for a short period. The channel from Macon to near Hawkinsville, a distance of 60 miles, was partially covered twice, there being removed from the channel 3,569 snags and 457 stumps, and there being cleared from the bank 57 logs and 35,530 overhanging trees by cutting and 45 by pulling back, while 2 trees were girdled. This boat was engaged for a few days in removing an old bridge pier at Macon for the Macon, Dublin & Savannah Railroad, at the expense of the railroad company.

The U. S. snagboat *Oconee* removed 36 snags and 4 stumps from the channel, and cleared 13 overhanging trees and 4 logs from the

banks while on trips made on account of towing other plant. There was expended in snagging operations, including the care of plant while laid up, \$2,085.77.

The U. S. dredge *Macon* excavated a channel 2,320 feet long and 5 feet deep at low water at Tillmans Bar, working from August 25 to October 13, 1915, and removing 18,537 cubic yards of material, at a cost of \$0.089 per cubic yard. There was quarried by the same plant for bank-protection work at this locality 95 cubic yards of rock, at a cost of \$1.75 per cubic yard. There was expended on this work \$1,822.89.

In addition to above \$1,436.15 was expended for survey contingencies and office expenses, making a total of \$17,457.90.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 512)		\$421, 500.00
Present project:		
July 25, 1912 (allotted Sept. 3, 1912)	\$20, 000	
July 25, 1912 (allotted Apr. 2, 1913)	2, 225	
Mar. 4, 1913 (allotted Apr. 22, 1913)	\$29, 000	
Less reallocation—		
Mar. 4, 1913—Dec. 26, 1913	\$2, 000	
Mar. 4, 1913—May 11, 1914	2, 000	
	4, 000	
		25, 000
Oct. 2, 1914 (allotted Oct. 17, 1914)		15, 000
Mar. 4, 1915 (allotted Apr. 24, 1915)		10, 000
July 27, 1916 (allotted Aug. 21, 1916)		30, 000
		102, 225.00
Total		523, 725.00
Amounts received from other sources, previously reported		802.28
Grand total		524, 527.28

COMMERCIAL STATISTICS.

There were four steamboats operated on this river; two of these made weekly trips between Lumber City and Hawkinsville, a distance of 123 miles, one made 16 trips between Macon and Brunswick, a distance of 208 miles over the Ocmulgee River; the remaining one was engaged in towing logs for the different mills. The Macon-Atlantic Navigation Co. expects to put on another new, self-propelled barge about the 1st of August. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
		Feet b. m.	Ton-miles.	
Cotton seed	650	48, 750		\$22, 750
Cotton and lintens	845	79, 205		156, 370
Cordwood	1, 050	78, 750		2, 100
Croesties	2, 600	140, 000		11, 500
Fertilizer	3, 400	255, 000		102, 000
Oak blocks	732	20, 900		14, 640
Naval stores	8, 142	610, 650		286, 977
Sugar	202	42, 016		20, 125
Staves	300	20, 000		5, 400
Miscellaneous	1, 965	168, 771		374, 247
By boats	19, 898		1, 464, 042	996, 109
Lumber, square, rafts and lighters	550	275, 000	36, 250	7, 250
Lumber, round, rafts and lighters	13, 209	6, 604, 606	548, 505	124, 197
Grand total	33, 645	6, 879, 606	2, 048, 797	1, 127, 556

10. CLUB AND PLANTATION CREEKS, GA.

The U. S. dredge *Creighton* redredged 1,200 linear feet of channel to a low-water depth of 7 feet, with a width of 100 feet, removing 12,758 cubic yards of material, in May and June, 1916. There was expended on this work \$1,013.12, but owing to large amount of liabilities falling into next fiscal year no unit cost is given.

APPROPRIATIONS.

Mar. 2, 1907.....	\$20, 000
June 25, 1910.....	20, 700
Total.....	40, 700

COMMERCIAL STATISTICS.

This waterway is an integral part of the inside waterway, and a part of the commerce handled and accredited to it is handled through this waterway. Every style of small craft going to the northward of Brunswick and the Altamaha River steamboats make use of this route, the Macon-Atlantic Navigation Co. having made 16 trips over this waterway during the year. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Timber.	Haul	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Crossties.....	2,427	.....	9,708	\$11, 095
Coal.....	800	.....	3, 200	2, 800
General merchandise.....	898	.....	3, 592	99, 277
Lumber, rafted and lighted.....	20, 942	110, 107, 308	83, 768	184, 584
Shell.....	5, 000	.....	20, 000	17, 560
Total.....	30, 067	110, 107, 308	120, 268	315, 266

¹ Included in tonnage.

11. BRUNSWICK HARBOR, GA.

There was expended \$330.02 in adding to the East River training wall 330.02 tons of ballast rock, under contract, at a cost of \$1 per ton.

There was expended \$4,275.73 in dredging Academy Creek, under an emergency contract with J. W. Fitzgerald, of Savannah, Ga. Work was begun December 18, 1915, and completed March 11, 1916, 57,406 cubic yards of material being removed, of which 28,100 cubic yards was above a depth of 20 feet below mean low water, 11,578 cubic yards between depths of 20 and 22 feet, and 17,728 cubic yards below a depth of 22 feet, for which the contractor received no pay. At the same time the contractor removed 20,125 cubic yards of material for the Atlantic Coast Line from in front of their wharf. The channel dredged for the Government has a width of 75 feet. That dredged by the Atlantic Coast Line increases the width to 115 feet for a distance of 2,200 feet.

The U. S. seagoing dredge *Sumter*, belonging to the Charleston, S. C., district, worked on the bar from July 1 to 10, 1915, removing 29,062 cubic yards of material. There was expended on this dredge

\$9,129.37. The unit cost of work with this dredge was \$0.0889 per cubic yard.

The U. S. seagoing dredge *Savannah* worked on the bar, Turtle River and East River from August 16 to October 31, 1915, removing a total of 207,612 cubic yards of material at an expenditure of \$11,006.92, at a unit cost of \$0.053 per cubic yard.

In addition to the above \$1,302.88 was expended in operation and care of inspection plant, and \$6,049.70 in surveys and office expenses, making a total of \$32,094.92.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 415) — \$710, 000

Present project:

Mar. 2, 1907 (river and harbor act)-----	\$146, 650	
Mar. 27, 1908 (sundry civil act)-----	308, 000	
Mar. 4, 1909 (sundry civil act)-----	47, 000	
June 25, 1910 (river and harbor act)-----	50, 000	
Feb. 27, 1911 (river and harbor act)-----	60, 000	
July 25, 1912 (river and harbor act)-----	33, 250	
Mar. 4, 1913 (river and harbor act)-----	33, 250	
Oct. 2, 1914 (allotment)-----	25, 000	
Mar. 4, 1915 (allotment)-----	30, 000	
July 27, 1916-----	36, 250	
		764, 400
Total-----		1, 474, 400
Amounts received from various sources, previously reported-----		178
Grand total-----		1, 474, 578

CONTRACTS IN FORCE.

Contractor: J. W. Fitzgerald, Savannah, Ga.

Character and amount of work and unit prices: 40,000 cubic yards of sand and mud to be dredged at a unit price of 12½ cents per cubic yard for all material down to 20 feet, and 6½ cents per cubic yard for all material between 20 and 22 feet, within the prescribed channel limits.

Date of approval: Emergency contract; no approval.

Date fixed for beginning work: December 18, 1915.

Date of beginning work: December 18, 1915.

Date of completion: March 11, 1916.

Percentage of completion at the end of fiscal year: 100.

COMMERCIAL STATISTICS.

Information in regard to the commerce of Brunswick before improvement will be found in the Annual Report of the Chief of Engineers for the fiscal year ending June 30, 1897.

The Clyde Steamship Co. operated a line of steamers between New York and Brunswick and other ports during the calendar year 1915, carrying 143,102 tons of freight, valued at \$29,403,471. No passengers were carried. Six steamers were operated, making 51 trips southbound and 53 northbound.

On the inland waters there are a number of small steamers plying between Brunswick and nearby ports, besides numerous schooners, sailboats, tugs, and gasoline launches towing barges. This class of commerce amounted to 89,174 short tons, valued at \$3,520,533. There were 79,854 passengers reported.

A number of sailing vessels operate between Brunswick and northern ports. The amount of commerce done by these vessels amounted to 133,505 tons, valued at \$883,081.

The commerce for the port of Brunswick during the calendar year 1915 was as follows:

Articles	Received.		Shipped.	
	Short tons.	Value.	Short tons.	Value.
Coastwise and local:				
Cotton and linters.....	152	\$33,720	4,520	\$724,640
Crossties.....	14,484	67,405	107,407	518,084
Cement.....	3,602	35,594	9	32
Coal.....	2,860	10,488	9	40
Fish and oysters.....	1,516	99,899		
Lumber.....	44,079	225,391	88,001	826,912
Naval stores.....	2,508	132,580	20,733	1,164,285
Salt.....	3,960	20,783		
Miscellaneous.....	48,243	17,998,150	31,514	11,835,833
Total.....	116,379	18,737,999	260,202	15,071,886
Foreign:				
Lumber and lumber products.....			29,791	369,610
Crossties.....			4,260	27,265
Cotton.....			48,983	8,740,513
Cottonseed meal.....			5,091	152,000
Naval stores.....			20,846	972,758
Iron and steel.....			22,635	414,868
Salt.....		116		
Tanning extract.....			2,166	179,834
Miscellaneous.....			8	8,684
Total.....		116	134,390	10,865,520
Grand total.....	116,379	18,738,115	394,592	25,937,406

Arrivals and clearances of vessels at Brunswick, Ga., 1915.

	Arrived.			Cleared.		
	Number.	Tons.	Crew.	Number.	Tons.	Crew.
Coastwise:						
Foreign vessels.....	21	43,951	558	12	25,706	322
American vessels.....	1	2,707	32	2	5,094	78
Foreign ports:						
Foreign vessels.....	32	59,396	840	43	79,281	1,092
American vessels.....	10	11,960	147	1	2,707	32
Total.....	64	118,016	1,577	58	113,390	1,534

12. FANCY BLUFF CREEK, GA.

There were no operations during the fiscal year. There was expended on account of liabilities incurred in connection with the operations of the preceding fiscal year and for office expenses and contingencies \$727.50.

APPROPRIATIONS.

Mar. 4, 1913 (river and harbor act)..... \$8,000
Mar. 4, 1915 (allotment.....)..... 2,000

Total..... 10,000

COMMERCIAL STATISTICS.

The commerce of this waterway is carried on principally by launches. One launch makes a round-trip daily and another makes a round-trip once a week. Numerous other miscellaneous launches and light-draft boats use this waterway during the entire year. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Crossties.....	510		2,040	\$2,550
Cordwood.....	380		1,520	920
Lumber, rafted.....	675	1 337,500	2,600	2,700
Naval stores.....	292		1,168	15,977
Miscellaneous.....	656		2,624	62,735
Total.....	2,513	1 337,500	9,952	84,882

¹ Included in tonnage.

There were 10,228 passengers carried during the year.

13. SATILLA RIVER, GA.

There were no operations during the fiscal year. There was expended for contingencies and office expenses \$519.39.

APPROPRIATIONS.

July 25, 1912.....	\$10,000
Mar. 4, 1913.....	10,000
Total.....	20,000
Transferred under authority of river and harbor act of Mar. 4, 1915.....	8,000
Net total.....	12,000

COMMERCIAL STATISTICS.

Both freight and passengers are carried on the lower 50 miles of the river, where there is one steamboat, which makes two trips per week, and several gasoline launches, which do not run on a regular schedule. During the calendar year 1915 miscellaneous shipments by rafts, lighters, tugs, launches, and sailing vessels amounted to 32,015 tons, valued at \$208,207. In addition to this, 31 schooners were towed from Brunswick through the inside waterway, up the Satilla River, and loaded at Ceylon, Owens Ferry, and Refuge Landing with lumber, crossties, etc., amounting to 32,501 tons, valued at \$182,946. It is reported that 2,201 passengers were carried. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Crossties.....	4,103		180,532	\$16,598
General merchandise.....	2,382		86,647	344,541
Lumber (square).....	31,247	1 15,623,741	843,669	184,396
Lumber (round).....	28,365	1 14,182,659	680,760	112,229
Naval stores.....	1,301		52,320	65,683
Total.....	67,398	1 29,806,400	1,843,940	723,447

¹ Included in tonnage.

14. FERNANDINA HARBOR, FLA., AND CUMBERLAND SOUND, GA. AND FLA.

There were no operations during the fiscal year. There was expended for contingencies and office expenses \$731.52.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 439 and 450)-----	\$932, 500. 00
Present project:	
June 3, 1896-----	\$5, 000. 00
June 4, 1897-----	350, 000. 00
July 19, 1897-----	50, 000. 00
July 1, 1898-----	450, 000. 00
Mar. 3, 1899-----	400, 000. 00
Mar. 3, 1901-----	200, 000. 00
June 28, 1902-----	400, 000. 00
Mar. 3, 1903-----	400, 000. 00
Apr. 28, 1904-----	55, 000. 00
Mar. 3, 1905 (river and harbor act)-----	30, 000. 00
Mar. 3, 1905 (sundry civil act)-----	40, 000. 00
Mar. 2, 1907 (river and harbor act)-----	75, 000. 00
Mar. 2, 1907 (river and harbor act)-----	115, 000. 00
Mar. 3, 1909 (allotted Mar. 24, 1909, from emergency appropriations)-----	20, 000. 00
June 25, 1910 (river and harbor act)-----	45, 000. 00
Feb. 27, 1911 (river and harbor act)-----	25, 000. 00
July 25, 1912 (river and harbor act)-----	15, 000. 00
Mar. 4, 1913 (river and harbor act)-----	40, 000. 00
	2, 715, 000. 00
Total-----	3, 647, 500. 00
Amounts received from various sources, previously reported-----	10. 90
Grand total-----	3, 647, 510. 90

COMMERCIAL STATISTICS.

The commerce of this port consists mainly of lumber, naval stores, crossties, phosphate rock, fish, oysters, and shrimp. During the calendar year 1915, 44,791,000 feet b. m. of lumber and crossties, valued at \$730,490, were shipped coastwise, and 4,413,000 feet b. m. of lumber, valued at \$79,929, were shipped foreign; 425,000 gallons of turpentine and 34 barrels of rosin, valued at \$181,655, were exported; 12,398 tons of phosphate rock, valued at \$123,980, were exported; 2,771 tons of fish, oysters, and shrimp, valued at \$448,460, were caught in Fernandina waters. There were 12,811 passengers carried between Fernandina and nearby ports. The commerce for the calendar year 1915 was as follows:

	Pounds.	Short tons.	Value.
Foreign exports-----		22, 716	\$365, 564
Foreign imports-----	536		101
Coastwise shipments-----		97, 671	735, 490
Domestic receipts-----		31, 643	649, 727
Local freight-----		9, 113	961, 316
Total-----	536	161, 143	2, 732, 197

Arrivals and clearances of vessels at Fernandina, Fla., 1915.

	Arrived.			Cleared.		
	Number.	Tons.	Crew.	Number.	Tons.	Crew.
Coastwise:						
Foreign vessels.....	4	3,736	75	2	4,147	68
American vessels.....	5	7,862	108	2	5,641	76
Foreign ports:						
Foreign vessels.....	9	12,212	194	16	15,564	245
American vessels.....	9	6,542	97	5	2,867	39
Total.....	27	29,872	472	25	28,219	422

15. ST. MARYS RIVER, GA. AND FLA.

The U. S. dredge *Croighton* in April and May, 1916, redredged, to a low-water depth of 17 feet and a width of 200 feet, the channels through Town Point Shoal and Long Reach Shoal. There was removed from the former locality 4,547 cubic yards of material and from the latter 20,494 cubic yards. The cost was \$0.186 per cubic yard. There was expended on this work \$4,664.94.

In addition to above, \$1,317.68 was expended for inspection plant, contingencies, surveys, and office expenses, making a total of \$5,982.62.

APPROPRIATIONS.

July 25, 1912.....	\$19,450
Mar. 4, 1915 (allotment Apr. 2, 1915).....	3,000
Total.....	22,450

COMMERCIAL STATISTICS.

A combination passenger and freight boat makes daily trips from Fernandina to Cold Rain Landing on the St. Marys River, a distance of 46 miles from its mouth. Barge traffic is carried on extensively for 10 miles farther up the river, and lumber and cross-ties are rafted on the river as far as 70 miles above its mouth. The main shipping port of the river is the city of St. Marys, located 8 miles from the mouth, from which at least 80 per cent of the commerce is carried on. During the calendar year 1915 the commerce was as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
Local commerce:		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Crossties.....	9,151	102,788		\$37,918
Naval stores.....	1,612	29,826		84,312
Miscellaneous.....	3,289	45,240		468,033
Timber, rafted.....	43,600	17,800,000	526,000	174,400
Foreign:				
Lumber, square.....	2,094	1,047,000	10,470	18,112
Lumber, round.....	948	474,000	4,740	34,941
Coastwise: Lumber, square and round.....	40,200	16,100,000	204,400	322,000
Grand total.....	100,894	35,421,000	923,464	1,139,717

Arrivals and clearances of vessels at St. Marys, Ga., 1915.

	Arrived.			Cleared.		
	Number.	Tons.	Crew.	Number.	Tons.	Crew.
Coastwise:						
Foreign vessels.....	2	1,693	27	.....	.....	.....
American vessels.....	1	1,154	9	.....	.....	.....
Foreign ports:						
Foreign vessels.....	4	2,036	30	2	1,693	29
American vessels.....				2	775	14
	7	4,883	66	4	2,468	43

16. WATERWAY BETWEEN SAVANNAH, GA., AND FERNANDINA, FLA.

The U. S. dredge *Augusta* completed on July 9, 1915, the dredging of Three Mile Cut, commenced the preceding fiscal year. During the fiscal year there was removed from 880 linear feet of channel 5,386 cubic yards of material, at a cost of \$0.0819 per cubic yard, giving a channel depth of 7 feet at mean low water, with a width of 75 feet. There was expended on this work \$2,086.16.

The U. S. dredge *Creighton* continued the dredging of Skidaway Narrows, begun June 10, 1915, and completed it March 18, 1916, removing 179,760 cubic yards of material from 11,915 linear feet of channel, giving a channel 100 feet wide and 7 feet deep at mean low water. Of this work 38 per cent was for restoring channel previously dredged, and 62 per cent was for increasing the width beyond what it had been previously. This dredge, from May 20 to May 27, 1916, redredged the channel through Cumberland Dividings, removing 11,479 cubic yards of material from 1,350 linear feet of channel, giving a channel 150 feet wide and 7 feet deep at mean low water. The *Creighton*, from May 7 to June 27, 1916, redredged 4,650 linear feet of channel in Jekyl Creek, giving it a depth of 7 feet at mean low water, with a width of 100 feet, and removing 79,743 cubic yards of material. The *Creighton*, from June 29 to 30, 1916, redredged 300 linear feet of channel in Three Mile Cut to a depth of 7 feet at mean low water and a width of 75 feet, removing 3,000 cubic yards of material. The total yardage removed by this dredge was 273,982, at an expenditure of \$21,653.63, a unit cost of 7.9 cents per cubic yard.

In addition to above, \$8,501.57 was expended as final payment for U. S. dredge *Creighton* and auxiliary plant, and \$547.05 as liabilities for U. S. dredge *Macon* from last year; \$2,125.64 for repair and operation of inspection plant and \$3,262.83 for surveys and office contingencies, making a total of \$38,176.88.

APPROPRIATIONS.

The total amount of appropriations made for the improvement of Bomerly Marsh and Parsons Cut, Jekyl Creek, Skidaway Narrows, and inland waterway (as shown on pp. 471, 538, 553, and 555 H. Doc. No. 1491, 63d Cong., 3d sess.) amounted to----- \$323,608.77

Present project:

July 25, 1912 (river and harbor act)-----	\$40,000.00	
Mar. 4, 1913 (river and harbor act)-----	100,000.00	
July 27, 1916-----	40,000.00	\$180,000.00
Total-----		503,608.77
Amount contributed by Georgia & Florida Steamboat Co. for Romerly Marsh-----		5,000.00
Total-----		508,608.77
Received from various sources, previously reported-----		689.40
Grand total-----		509,298.17

COMMERCIAL STATISTICS.

The commerce over this route is quite varied. Four combined freight and passenger steamers run over portions of the route between Darien and Fernandina, and two in the vicinity of Savannah. A large number of barges towed by gasoline and steam launches transport naval stores, crossties, lumber, and timber to Brunswick and take away miscellaneous freight. At various landings on the rivers entering the inside route a large amount of lumber and timber is collected and rafted to various points reached by it, principally Savannah, Sapelo, Darien, and Brunswick. Total lumber and crossties amounted to 49,106,221 feet b. m., valued at \$722,931. Principally all the freight carried over this route is upon detached sections. The commerce for the calendar year 1915 was as follows:

Articles.	Short tons.	Lumber.	Haul.	Value.
		<i>Feet b. m.</i>	<i>Ton-miles.</i>	
Cotton-factory products.....	477	13,033		\$121,250
Crossties.....	11,458	5,110,669	282,342	53,463
Coal.....	809	77,063		2,840
Cord wood.....	1,131	28,826		2,436
Fish and oysters.....	6,781	70,572		82,679
Groceries.....	1,686	30,378		419,830
Grain.....	1,107	14,149		33,120
General merchandise.....	1,328	13,536		172,225
Lumber:				
Round.....	38,668	17,553,601	487,223	186,294
Square.....	53,606	26,441,951	2,086,338	483,174
Oyster shells.....	28,247		1,015,527	52,027
Oak blocks.....	760		19,328	8,088
Naval stores.....	2,676		47,097	135,361
Sugar.....	733		18,967	79,527
Miscellaneous.....	8,476		211,968	1,166,316
Total.....	157,932	49,106,221	4,411,946	3,000,627

Between Brunswick, Fernandina, Darien, and intermediate points there were transported 30,366 passengers during 1915. During the same period 33 vessels with a gross tonnage of 30,294 were towed from Brunswick, either through Jekyl Creek to some point to the southward or through the inside route to the northward. A great number of small launches and yachts with tonnage varying from 7 to 100 passed over this route to and from the north and Florida points. These boats all use the recently improved waterways.

IMPROVEMENT OF RIVERS AND HARBORS IN THE JACKSONVILLE FLA., DISTRICT.

REPORT OF MAJ. W. B. LADUE, CORPS OF ENGINEERS.

IMPROVEMENTS.

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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 672 TO 747.

1. CHANNEL BETWEEN ST. JOHNS RIVER AND CUMBERLAND SOUND, GA. AND FLA.

No work was done on this improvement during the fiscal year. The expenditure was for cost of procuring commercial statistics during previous year, and for payment of an outstanding liability from last year.

A slight amount of shoaling has taken place in various localities along the line of this channel, but not to less than project depth, excepting Kingsleys Cut, where a shoal about 300 feet long has formed south of the railroad bridge, having a least depth of 6.2 feet over it at mean low water.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 543)--- \$102,000.00
Present project:

Mar. 4, 1913.....	\$50,000.00
Aug. 1, 1914 (sundry civil act).....	51,000.00
Mar. 4, 1915 (allotted).....	2,500.00
July 27, 1916.....	1,000.00
	<hr/> 104,500.00

Total of appropriations.....	208,500.00
Returned to Treasury, carried to surplus fund June 30, 1890.....	4,434.45
	<hr/>
Net total.....	202,065.55

2291

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.
AMERICAN.		
Unregistered:		
Steamers.....	44	4,740
Lighters.....	30	22,500
Rafts.....	20	1,175
Total.....	94	27,415

NOTE.—The above includes both arrivals and departures. In addition there are a number of boats engaged in the fishing and oyster business.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Crosetties.....	10,000	850	\$6,000
Logs, pine.....	21,039,000 feet b. m.	46,071	189,300
Lumber.....	6,624,000 feet b. m.	10,728	63,990
Oyster shell.....	5,000 barrels	500	625
Shrimp.....	500 barrels	38	3,375
Total.....		58,187	263,290

NOTE.—There are no regular boats and no rates upon freight.

Number of regular steamers in trade now, none.

Estimated percentage of trade carried by water, 2 per cent.

Effect of improvement on freight rates, none.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

Many yachts use the waterway during the winter season.

2. ST. JOHNS RIVER, FLA., JACKSONVILLE TO THE OCEAN.

Rock excavation in westerly half of Trout Creek Cut, under contract dated August 6, 1913, with the Home Dredging Co., which was reported as nearly completed at the close of last year, was completed March 10, 1916. The work done during this fiscal year consisted in the removal of irregularities in the bottom above project depths at scattered localities which had previously been dredged over. No accurate estimate of the volume of this work can be made, but approximate estimates aggregate 24,395 cubic yards. Payment for 1,350 cubic yards of material removed to a depth of 30 feet and 12,200 cubic yards between depths of 30 feet and 32 feet was made during the year. Final voucher under this contract, amounting to \$21,553.29, was sent on May 19 to the auditor for settlement. The total quantity of material removed under this contract since work began amounted to 115,191 cubic yards to a depth of 30 feet and 61,227 cubic yards between depths of 30 and 32 feet at contract prices of \$1.35 per yard for material removed to a depth of 30 feet and 67½

cents per yard for material removed between depths of 30 and 32 feet; the work cost \$196,836.07. As a result of this work, Trout Creek Cut has been completed to its full project width and depth.

Under the contract with the Standard American Dredging Co. dated August 16, 1915, for the removal of rock shoals and overlying material which had been found impracticable to remove with the usual type of hydraulic dredge in Mile Point, White Shells, Dames Point, Six Mile Creek, and Arlington Cuts, about 6, 8, 15, 22, and 25 miles, respectively, above the entrance to the river, work began in Dames Point Cut January 28, 1916. At the close of the year, approximately 102,889 cubic yards of original material and 3,320 cubic yards of filled material had been removed under this contract from the upper portion of the rock area in Dames Point Cut. At contract prices of \$0.978 per cubic yard for original material and \$0.12 per cubic yard for filled material, this work cost \$100,828.24. As a result of the work the channel was completed to full width and depth for a distance of about 2,000 feet and part width for a further distance of 600 feet.

The pipe-line dredge *Major J. C. Mallery* was on maintenance work between Clapboard Creek and Fulton at the beginning of the year. This work was completed September 3, and the dredge began original work in Drummonds Cut, between Trout Creek and Cedar Creek, on September 9, 1915, and continued work at this locality until December 31, 1915. At the end of December the dredge was withdrawn for repairs, which were in progress during the months of January and February, 1916. Work with this dredge was in progress in Pilot Town Cut from March 15 until April 25 and in Wards Bank Cut from April 26 until the close of the fiscal year. During the year this dredge removed 197,027 cubic yards of material from Fulton Cut, 406,525 from Drummonds Cut and 4,114 cubic yards from a small shoal in Dunns Creek Cut adjacent, 84,821 cubic yards from Pilot Town Cut, and 157,985 cubic yards from Wards Bank Cut. Fulton cut was restored to project dimensions, but shoaling has since occurred. Rock was encountered in Drummonds Cut at depths varying from 27.5 to 30 feet, and full depth throughout the cut was not obtained. Pilot Town Cut was completed to full depth for a least width of 375 feet, and Wards Bank Cut, with the work of the dredge *Key West* in this cut included, was completed to project depth for a least width of 250 feet.

The total amount removed by this dredge was 850,472 cubic yards, at a total field cost of \$71,224.85, or 8.37 cents per yard. Repairs and supervision cost \$16,956.30, making the gross cost 10.37 cents per cubic yard.

The dredge *Key West* returned to this district from the Wilmington, Del., district, December 2, 1915, and was undergoing repairs from that date until the end of January. The dredge resumed work in Wards Bank Cut February 3, 1916, and at the close of the year had removed 208,645 cubic yards of material from Wards Bank Cut, 30,816 cubic yards from Jetty Cut, and 37,846 cubic yards from Bar Cut, a total of 277,307 cubic yards. The field cost of this work was \$16,946.38, or 6.11 cents per cubic yard. Repairs and supervision cost \$15,431.99, making the gross cost \$32,378.37, or 11.32 cents per cubic yard. The sum of \$5,416.01 was received from the Wil-

mington, Del., district for rental of this dredge. The net total cost was therefore \$26,962.36, or 9.72 cents per cubic yard.

Such changes as have taken place on the outer shoal forming the bar at the entrance are favorable. The outer 30-foot contour has not advanced, while the inner 30-foot contour has advanced seaward about 200 feet. The shoal area between has increased in depth an average of about 2 feet. The least depth within the limits of the 600-foot channel straight to sea across the outer shoal is 27 feet. In the path usually followed by vessels, however, the available depth is in excess of 30 feet at mean low water.

Some shoaling has occurred in Mile Point and Fulton Cuts, and maintenance work will be needed at these localities in the near future to restore project widths and depths. Elsewhere there has been little decrease in channel dimensions during the year.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 543) - \$4,055,089.02
Present project:

June 25, 1910-----	\$300,000.00	
Feb. 27, 1911-----	425,000.00	
July 25, 1912-----	300,000.00	
Aug. 24, 1912 (sundry civil act)-----	350,000.00	
Mar. 4, 1913-----	550,000.00	
June 23, 1913 (sundry civil act)-----	150,000.00	
Oct. 2, 1914 (allotted)-----	217,000.00	
Mar. 4, 1915 (allotted)-----	435,000.00	
July 27, 1916-----	300,000.00	
		3,027,000.00
Total of appropriations-----		7,082,089.02
Returned to surplus fund of Treasury-----		827.17
Net total-----		7,081,261.85
Receipts from various sources prior to June 30, 1909-----		3,009.40
Receipts from sales and inspection service-----		8,215.87
Rent of dredges <i>St. Johns, Jacksonville, and Key West</i> -----		46,918.77
Grand total-----		7,134,405.89

CONTRACTS IN FORCE.

Contractor: Home Dredging Co., Mobile, Ala.

Amount and character of material and price per unit: Removing approximately 127,000 cubic yards of material, at \$1.35 per cubic yard to 30 feet and 67½ cents per cubic yard from 30 to 32 feet.

Date of approval: August 27, 1913.

Date of beginning work: November 2, 1913.

Date of expiration: March 2, 1915 (extended for a reasonable period).

Completed March 10, 1916, but final payment not yet made.

Contractor: Standard American Dredging Co., Oakland, Cal.

Amount and character of material and price per unit: Removing approximately 180,000 cubic yards of original material, at \$0.978 per cubic yard, measured in place, and 12 cents per cubic yard, place measurement, for filled material; one-half price for material removed not over 1 foot below required depth.

Date of approval: September 7, 1915.

Date of beginning work: December 15, 1915; waived for a reasonable period December 11, 1915.

Date of expiration: October 15, 1916 (approximately).

Percentage of completion: 39.

Contractor: Logan Coal & Supply Co., Jacksonville, Fla.
Amount and character of material and price per unit: 4,000 long tons of coal, at \$4.42 per ton.
Date of approval: August 2, 1915.
Date of beginning work: July 5, 1915.
Date of expiration: June 30, 1916.
Completed.

Contractor: The Manhattan Rubber Manufacturing Co., Passaic, N. J.
Amount and character of material and price per unit: Furnishing dredging sleeves to dredges of the Jacksonville, Fla., district at various prices from \$10.70 to \$51.78.
Date of contract: February 10, 1916 (emergency).
Date of beginning work: To be furnished as ordered.
Date of expiration: December 31, 1916.
Percentage of completion at end of fiscal year: Indefinite.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Ameri- can.	Foreign.	Total.	Net registered tonnage.	Passen- gers.
Registered:					
Steamers.....	2,418	54	2,472	3,917,638	65,688
Sailing.....	328	19	347	115,461	.....
Barges.....	159	.....	159	121,490	.....
Unregistered:					
Steamers.....	2,600	.....	2,600	.....	9,360
Lighters.....	3,000	.....	3,000	49,500	.....
Rafts.....	200	.....	200	75,000	.....
Total.....	8,715	73	8,788	4,261,679	75,048

NOTE.—The above includes both arrivals and departures. In addition there is much local commerce carried by small private launches.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Automobiles.....	395.....	945	\$592,500
Cement and plaster.....	113,500 barrels.....	22,700	187,275
Coal.....	193,353 tons.....	193,353	966,765
Cotton.....	56,400 bales.....	8,677	1,735,400
Crushed stone.....	5,905 tons.....	5,905	17,750
Fertilizer.....	11,975 tons.....	11,975	299,375
Fuelers earth and kaolin.....	26,751 tons.....	26,751	515,020
Grain.....	191,820 sacks.....	9,591	287,730
Logs, pine.....	125,000,000 feet b. m.....	75,000	1,125,000
Iron pyrites.....	19,752 tons.....	19,752	98,910
Lumber and cross-ties.....	363,312,280 feet b. m.....	817,453	5,449,680
Miscellaneous.....	495,326 tons.....	495,326	29,719,560
Naval stores:			
Turpentine.....	75,341 barrels.....	16,969	1,812,055
Rosin.....	367,016 barrels.....	91,754	2,752,620
Oils:			
Refined.....	1,279,000 barrels.....	262,800	12,640,000
Fuel.....	4,600,000 gallons.....	16,141	161,410
Crescote.....	3,100,000 gallons.....	13,778	275,560
Oranges and fruits.....	858,725 boxes.....	34,349	1,030,470
Phosphate.....	7,700 tons.....	7,700	38,500
Salt.....	2,950 tons.....	2,950	29,500
Sand and shell.....	168,000 tons.....	168,000	210,000
Vegetables.....	855,840 crates.....	21,396	1,069,800
Watermelons.....	96 carloads.....	1,152	8,064
Total.....		2,313,446	61,022,944

Number of regular steamers in the trade, 25.
 Estimated percentage of total trade carried by water, 60 per cent.
 Effect of improvement on freight rates: Has lowered rates materially.
 Transportation lines established during 1915, none.
 Transportation lines abandoned during 1915, none.

3. ST. JOHNS RIVER, FLA., OPPOSITE THE CITY OF JACKSONVILLE.

In the latter part of 1915 an obstruction was discovered about 20 feet outside the pierhead line in front of the wharf of the Weller Coal Co., near the foot of Hogan Street. This was found to be a large detached fragment of rock, with about 18 feet of water over its top. On December 24, 1915, an allotment of \$300 was made by the Secretary of War from the appropriation for emergencies in rivers and harbors for the removal of this obstruction. The rock was removed March 20, 1916, with a hired clamshell dredge, at a cost of \$109.50, including all incidental expenses, and the balance of the allotment, amounting to \$190.50, was returned to the credit of the emergency appropriation.

APPROPRIATIONS.

Mar. 2, 1907.....	\$371, 500. 00
June 25, 1910.....	115, 000. 00
Mar. 4, 1913 (allotted).....	¹ 109. 50
Total.....	486, 609. 50

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Ameri- can.	Foreign.	Total.	Net regis- tered tonnage.	Passen- gers.
Registered:					
Steamers.....	¹ 80, 988	30	81, 018	21, 592, 521	1, 293, 981
Sailing.....	169	4	173		
Unregistered:					
Steamers.....	2, 600	.....	2, 600	2, 600	.....
Lighters.....	3, 000	.....	3, 000	49, 000	.....
Rafts.....	400	.....	400	135, 000	.....
Total.....	87, 157	34	87, 291	21, 779, 121	1, 293, 981

¹ Includes ferryboats.

NOTE.—The above includes both arrivals and departures.

¹Allotment of \$300, of which \$190.50 was returned to Treasury, to the credit of the appropriation.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Cotton.....	55,400 bales.....	8,677	\$1,735,400
Cement.....	113,500 barrels.....	23,700	187,275
Coal.....	193,490 tons.....	193,490	967,450
Fertiliser.....	12,200 tons.....	12,200	246,805
Fruits.....	944,726 crates.....	37,789	1,123,670
Lumber:			
Cypress.....	10,000,000 feet b. m.....	13,000	300,000
Pine.....	184,000,000 feet b. m.....	408,160	2,724,225
Logs, pine.....	8,000,000 feet b. m.....	17,000	73,000
Miscellaneous.....	533,085 tons.....	533,085	31,985,100
Naval stores.....	442,357 barrels.....	108,723	4,574,675
Salt.....	2,950 tons.....	2,950	26,500
Vegetables.....	861,479 crates.....	21,508	1,077,748
Watermelons.....	96 carloads.....	1,152	8,064
Total.....		1,385,434	45,141,912

This tonnage includes ferry traffic, freight handled by river lines having terminals at Jacksonville, and ocean-going freight handled at terminals in this stretch.

Effect of improvement on freight rates: Has greatly facilitated and enlarged water traffic by enabling large vessels to reach the piers.

4. ST. JOHNS RIVER, FLA., JACKSONVILLE TO PALATKA.

Work began at Forresters Point Shoal with the dredge *Florida* October 11, 1915, and continued until November 23, 1915, when the channel at this locality was completed to project dimensions. The work done was the excavation of a cut 60 feet wide, 14 feet deep, and 13,382 feet long, with an additional widening of 100 feet in the two bends in the channel. Some maintenance dredging was also done. A total of 107,662 cubic yards of material was removed in this work, at a field cost of \$6,896.92, or 6.4 cents per cubic yard. Including current incidental expenses, the cost was \$7,401.09, or 6.87 cents per cubic yard. The cost of bringing the dredge from Indian River, the cost of a new drag, a portion of the cost of preparing the dredge to lay up and its care since, and other incidental expenses paid during the year from funds available for this improvement amounted to \$4,031.97, or a total expenditure of \$11,433.06, making the total cost per cubic yard 10.6 cents.

This project has been completed, but maintenance work will be needed from time to time.

APPROPRIATIONS.

Mar. 3, 1899.....	\$40,000	June 25, 1910.....	\$32,400
June 13, 1902.....	30,000	July 25, 1912.....	15,000
Mar. 3, 1905.....	25,000	Mar. 4, 1913.....	19,600
Mar. 3, 1905 (emergency allotment).....	3,000	Oct. 2, 1914 (allotment).....	5,000
Mar. 2, 1907.....	25,000	Mar. 4, 1915 (allotment).....	10,000
Mar. 3, 1909 (emergency allotment).....	8,640	July 27, 1916.....	16,000
		Total.....	229,640

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	3,698	208,471	36,737
Sailing.....	37	28,400	.....
Unregistered:			
Lighters.....	600	109,500	.....
Rails.....	400	135,000	.....
Total.....	4,735	481,171	36,737

NOTE.—The above includes both arrivals and departures.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Automobiles.....	110.....	99	\$220,000	60	.....
Cattle.....	185 head.....	86	8,950	60	.....
Cement.....	5,789 sacks.....	231	5,457	60	2.0
Coal.....	137 tons.....	137	685	60	2.0
Crate material.....	7,620 packages.....	208	3,810	60	1.7
Fertilizer.....	31,620 sacks.....	1,581	47,430	60	2.0
Fish.....	3,947 barrels.....	493	31,576	60	4.0
Grain and hay.....	43,120 packages.....	2,156	64,680	60	2.0
Grapefruit and oranges.....	86,000 boxes.....	3,440	103,200	60	3.0
Logs:					
Pine.....	8,000,000 feet b. m.....	17,000	72,000	10	.....
Cypress.....	15,609,000 feet b. m.....	78,000	202,917	30	.....
Lumber:					
Pine.....	4,000,000 feet b. m.....	8,000	60,000	60	.....
Cypress.....	10,000,000 feet b. m.....	18,000	300,000	.....	.....
Miscellaneous.....	37,759 tons.....	37,759	2,285,540	60	5.0
Naval stores.....	196 tons.....	196	77,629	60	2.1
Vegetables.....	5,639 crates.....	112	7,948	60	3.0
Total.....		167,498	3,469,822	.....	.....

Number of regular steamers in the trade, 7.

Estimated percentage of total trade carried by water, 60 per cent.

Effect of the improvement on freight rates: Rail rates have been reduced to equal water rates.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

5. ST. JOHNS RIVER, FLA., PALATKA TO LAKE HARNEY.

The dredge *Florida* began work at Volusia Bar November 29, 1915, and completed the work at this locality December 18, 1915, completing the project, excepting the upper portion of the channel in Lake Monroe, between the lower bar and Sanford, where the depth is sufficient for present needs of navigation, though project depth has never been attained throughout. Maintenance dredging in the river above Volusia Bar and in Lake Monroe was in progress until February 17, 1916.

The work accomplished is tabulated as follows:

Locality.	Out dredged.		Depth dredged.	Yardage removed.
	Length.	Width.		
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
Volusia Bar.....	2,077	100	9	16,023
Alco Cut.....	650	100	9	2,852
Revolving Bend Point.....	300	50	9	2,156
Hermitage Point.....	250	100	9	4,198
Huntton Bend Point.....	455	200	9	12,511
Dark Alley Bend Point.....	700	100	9	4,926
Lower Bar Lake Monroe.....	2,176	50	8	8,547
Sanford Harbor.....	300	100	6.5-8.5	2,586
Total.....				54,819

¹ An additional width of 50 feet was made in the turn in the channel at this locality.

During the course of this work the dredge removed 24 snags and 62 overhanging trees at a prorated cost, for time consumed, of \$188. The field cost of this work was \$7,339.38, and the dredging cost 13.04 cents per cubic yard. With current incidental expenses, the cost was \$8,424.26, or 15.02 cents per cubic yard, for the dredging. An appreciable portion of the material dredged was clay and hardpan. The cost of certain repairs to the dredge, a portion of the cost of preparing the dredge to lay up, and its care since, and other incidental expenses paid during the year from the funds available for this improvement, amounted to \$1,860.98, or a total expenditure of \$10,410.24, making the total cost per cubic yard 18.99 cents.

The dredge *Florida* was engaged in private work at Sanford from February 17 to 22, 1916. The cost of operating the dredge during this period was \$421.57, which amount was refunded by the private interests involved, who also paid to the appropriation the sum of \$125 to cover wear and depreciation of plant.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 544)....¹ \$55,838.00

Present project:

June 25, 1910.....	\$32,400.00	
Feb. 27, 1911.....	30,000.00	
July 25, 1912.....	25,000.00	
Mar. 4, 1913.....	42,200.00	
Oct. 2, 1914 (allotted).....	5,000.00	
Mar. 4, 1915 (allotted).....	10,000.00	
July 27, 1916.....	16,000.00	160,600.00
Total of appropriations.....		216,438.00
Carried to surplus fund of Treasury.....		304.29
Net total.....		216,133.71
Rent of dredge.....		125.00
Receipts from sales.....		4.45
Grand total.....		216,263.16

¹ Reduced by \$2, allotment Sept. 30, 1908, act of Mar. 2, 1907, returned to credit of emergency appropriation.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered steamers.....	1,762	205,747	34,700
Unregistered rafts.....	1,062	108,674	.....
Total.....	2,814	312,421	34,700

NOTE.—The above includes both arrivals and departures. In addition there are more than 50 launches on the river.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				Miles.	Cents.
Automobiles.....	112.....	100	\$224,000	142	.....
Cattle.....	166 head.....	77	7,000	142	1.1
Cement.....	5,789 sacks.....	205	5,457	142	.7
Coal.....	86 tons.....	117	688	142	.7
Crate material.....	10,668 packages.....	291	5,394	142	.6
Fertilizer.....	15,444 sacks.....	1,495	45,150	142	.7
Fish.....	3,996 barrels.....	499	31,968	142	.....
Grain and hay.....	42,781 packages.....	2,255	67,660	142	1.2
Grape fruit and oranges.....	57,223 boxes.....	2,237	71,627	142	2.1
Ice.....	120 tons.....	120	600	Local.	.....
Logs:					
Cypress.....	17,109,000 feet b. m.....	85,500	205,308	80	.....
Pine.....	17,817,250 feet b. m.....	40,224	181,637	50	.....
Naval stores:					
Turpentine.....	234 barrels.....	47	5,616	142	3.1
Rosin.....	662 barrels.....	149	3,310	142	2.8
Miscellaneous.....	18,017 tons.....	18,017	1,801,700	142	2.8
Vegetables.....	5,242 crates.....	104	6,551	142	2.8
Total.....		151,487	2,663,596		

NOTE.—Of the above amount 29,393 short tons came from Oklawaha River and 19,310 short tons from Crescent Lake and Dunns Creek.

Number of regular steamers in the trade, 7.

Estimated percentage of total trade carried by water, 60 per cent.

Effect of the improvement on freight rates: They are 50 per cent lower than at other places where there is no water competition.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

6. LAKE CRESCENT AND DUNNS CREEK, FLA.

Incidental to the work of removing water hyacinth from Haw Creek, a tributary of Lake Crescent, the power boat *Captain Maguire* removed from the dredged channel at lower end of Lake Crescent, in April, 1916, 3 logs, and 13 logs and 23 stumps in June, 1916, all at a cost of \$112.65.

The dredged channel has shoaled slightly, so that the available depth in the cut at the lower end of Lake Crescent is limited to 7½ feet at mean low water.

APPROPRIATIONS.

Mar. 4, 1918 _____ \$25,000

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	1,584	49,608	4,379
Rafts.....	200	.....	.....
Total	1,784	49,608	4,379

Note.—The above includes both arrivals and departures. In addition, there are about 25 launches on the lake.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				Miles.	Cents.
Flour.....	194 barrels.....	19	\$1,140	87	.....
Grain and hay.....	2,900 packages.....	145	4,350	87	2.5
Logs:					
Pine.....	3,122,000 feet b. m.....	7,025	28,098	27	.....
Cypress.....	1,500,000 feet b. m.....	7,500	31,220	.....	.....
Lumber.....	159,000 feet b. m.....	318	18,000	27	.....
Miscellaneous.....	640 tons.....	640	67,984	.....	.....
Oranges.....	91,575 boxes.....	2,663	109,890	87	2.9
Total.....	.....	19,310	260,623	.....	.....

Number of regular steamers in trade, 8.

Estimated percentage of total trade carried by water, 80 per cent.

Effect of the improvement on freight rates not determinate.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

7. OKLAWAHA RIVER, FLA.

Following complaints of accumulation of obstructions in the river, the United States power boat *Captain Maguire* worked on the river from March 27 until April 8, 1916, when work was temporarily suspended for more pressing work elsewhere. Work was resumed June 17, 1916, and was still in progress at the close of the year. This work resulted in the removal of a total of 51 logs, 16 snags, 39 overhanging trees, 11 stumps, and 154 clusters of overhanging brush between the mouth of the river and a point 44 miles above the mouth; and the rock shoal near the mouth of Orange Creek was blasted and about 60 cubic yards of rock was removed, increasing the depth from 3½ feet to 4 feet over this shoal at the extreme low stage then existing. The field cost of this work was \$823.26. The total expenditure, including office expenses, was \$1,398.26.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 68d Cong., 8d sess., p. 516).....	\$10,000.00
Present project:	
Sept. 19, 1890.....	\$10,000.00
July 18, 1892.....	1,000.00
Aug. 18, 1894.....	8,000.00
June 8, 1896.....	8,000.00
Mar. 8, 1899.....	8,000.00
June 18, 1902.....	2,000.00
Mar. 8, 1905.....	2,000.00
Mar. 2, 1907.....	15,000.00
Mar. 8, 1909.....	4,000.00
June 25, 1910.....	20,710.00
July 25, 1912.....	15,000.00
July 27, 1916.....	10,000.00
	88,710.00
Total of appropriations.....	98,710.00
Returned to the surplus fund of the Treasury.....	6,088.05
Net total.....	92,621.95

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Registered steamers.....	708	15,468	6,200
Unregistered rafts.....	288	27,624	.....
Total.....	.....	43,092	6,200

NOTE.—The above includes both arrivals and departures. In addition, there are 100 launches on the river and upper lakes.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.
Crate material.....	5,943 bundles.....	54	\$1,350	Miles. 80
Grain and hay.....	1,940 packages.....	97	2,910	80
Logs:				
Cypress.....	1,500,000 feet b. m.....	7,500	18,000	80
Pine.....	8,943,000 feet b. m.....	20,124	90,487	50
Naval stores.....	1,835 barrels.....	463	21,179	50
Miscellaneous.....	1,011 tons.....	1,011	101,100	.....
Oranges.....	3,350 boxes.....	134	3,720	80
Total.....	.....	29,393	238,746	.....

Number of regular steamers in the trade, 4. Two passenger boats; the other two are small boats with no regular freight rates.

Estimated percentage of total trade carried by water, 5 per cent.

Effect of improvement on freight rates not determinate.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

8. INDIAN RIVER, FLA.

Work with the U. S. dredge *Florida*, in progress at the close of the last fiscal year, was suspended September 24, 1915, owing to exhaustion of available funds. The cut leading from the channel in Indian River, near the mouth of St. Lucie River, into Great Pocket and cuts through the various shoals between the northern end of Pecks Lake and Jupiter Inlet and the southern end of the canal between Great Pocket and Pecks Lake, for a distance of 322 feet, were completed to project dimensions. A total of 91,186 cubic yards of material, consisting of sand and shell and a small amount of hardpan, was removed at a field cost of \$8,770.35, or 9.82 cents per cubic yard. The gross cost during the year was \$9,212.58, or 10.10 cents per cubic yard.

A recent examination indicates that the channel in this portion of Indian River is in good condition, though some shoaling has occurred north of St. Lucie Inlet. The cut-off canal between Great Pocket and Pecks Lake remains to be widened from 35 feet to the project width of 75 feet.

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 469)..... \$6,500.00
Present project:

July 18, 1892 (between Goat Creek and Jupiter Inlet).....	\$15,000.00
Aug. 18, 1894 (for Negro Cut, Indian River Inlet).....	5,000.00
Mar. 2, 1895 (for Negro Cut, Indian River Inlet).....	15,000.00
Feb. 23, 1896 (Jupiter Inlet).....	500.00
June 3, 1896 (for Negro Cut, Indian River Inlet).....	7,500.00
Mar. 8, 1899 (for Negro Cut, Indian River Inlet).....	5,000.00
June 6, 1900 (allotments of Feb. 2, 1901, \$800; Feb. 23, 1901, \$200, from emergency appropriation) (for Jupiter Inlet).....	1,000.00
June 13, 1902 (between Goat Creek and Jupiter Inlet).....	2,000.00
Mar. 8, 1905 (between Goat Creek and Jupiter Inlet).....	20,000.00
Mar. 2, 1907 (allotments of Apr. 3, 1908, \$5,000; May 28, 1908, \$5,000, from emergency appropriation).....	10,000.00
Mar. 3, 1909.....	4,000.00
Mar. 8, 1905 (allotment of June 8, 1909, from emergency appropriation).....	¹ 1,517.10
June 25, 1910.....	13,000.00
Mar. 4, 1913.....	22,000.00
Oct. 2, 1914 (allotted).....	10,000.00
Mar. 4, 1915 (allotted).....	10,000.00
Mar. 2, 1907 (between Goat Creek and Jupiter Inlet).....	9,000.00
July 27, 1916.....	20,000.00
Total of appropriations (present project).....	170,517.10
Total of appropriations.....	177,017.10
Returned to surplus fund of Treasury.....	1,505.06
Net total.....	175,512.04
Rent of dredge.....	14.62
Grand total.....	175,526.66

¹ Allotment of \$2,000, of which \$482.90 was returned to Treasury, to credit of appropriation.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Not registered tonnage.	Passengers.
AMERICAN.			
Registered steamers.....	608	47,346	2,090
Unregistered lighters.....	202	10,300	.....
Total.....	810	57,646	2,000

NOTE.—The above includes both arrivals and departures. There are more than 1,500 small launches on the river that carry the greater part of the traffic, which is mainly private. Many thousands of passengers are carried by these private boats.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				Miles.	Cents.
Automobiles.....	26.....	13	\$20,800	260	.....
Bacon (salt).....	1,700 boxes.....	206	61,260	209	.....
Beans.....	27,000 hampers.....	405	40,500	(1)	.....
Beer (bottled).....	5,200 barrels.....	280	62,000	200	.....
Cement.....	6,000 bags.....	300	3,000	200	.....
Canned goods.....	18,000 cases.....	715	71,500	200	.....
Crate material.....	4,000 packages.....	200	4,000	200	.....
Dry goods, etc.....	750 cases.....	170	30,000	200	.....
Fertilizer.....	3,650 sacks.....	280	8,700	200	.....
Fish.....	38,906 barrels.....	3,891	422,873	(1)	.....
Grain and hay.....	140,000 packages.....	7,000	155,000	200	1.0
Grapefruit.....	14,000 boxes.....	560	24,000	(1)	.....
Groceries.....	300 tons.....	300	60,000	200	3.3
Ice.....	2,500 tons.....	2,500	15,000	(1)	.....
Lumber.....	1,525,000 feet b. m.....	3,050	30,500	(1)	.....
Machinery.....	600 tons.....	600	30,000	(1)	.....
Miscellaneous.....	8,170 tons.....	8,170	812,316	200	3.3
Oils:					
Machine.....	220 barrels.....	44	2,220	200	.....
Refined.....	6,710 drums.....	1,398	90,876	200	.....
Oranges.....	15,000 boxes.....	600	24,000	200	.....
Sand.....	1,000 cubic yards.....	900	900	(1)	.....
Shell.....	50,000 barrels.....	5,000	6,250	(1)	.....
Sugar.....	300 barrels.....	40	5,288	200	.....
Tomatoes.....	12,000 crates.....	220	12,000	(1)	.....
Vegetables.....	3,000 crates.....	165	1,360	(1)	.....
Total.....		36,966	1,974,239	.....	.....

¹ Local.

Of the above amount, 19,675 short tons was through commerce, the balance being carried from the islands in small boats and lighters to the nearest railroad station.

Number of regular steamers in trade, 7.

Effect of improvement on freight rates: Rates have been reduced about 35 per cent between Jacksonville and Titusville and about 15 per cent between Jacksonville and Fort Pierce.

Transportation lines established during 1915: The Howard Transportation Co. succeeded the Canal Packet Co. and added three additional steamers to the line.

Transportation lines abandoned during 1915: The Atlanta Fish Co. line was taken over by the Howard Transportation Co.

9. ST. LUCIE INLET, FLA.

Proposals for the construction of a dipper dredge for doing this work and the work in harbor at Miami, Biscayne Bay, Fla.; also proposals for doing the dredging by contract, were opened November 8, 1915. All bids were rejected and contract was entered into with the Standard American Dredging Co., based upon an informal proposal to dredge a channel through the entrance 125 feet wide and not less than 12 feet deep. The necessary preliminary survey for laying out the work began March 21 and was completed May 16, 1916. The contractor's dredge *San Diego* entered the inlet June 15, 1916, but had not begun dredging in the cut at the close of the fiscal year.

APPROPRIATIONS.

Mar. 4, 1915-----\$100,000

CONTRACTS IN FORCE.

Contractor: Standard American Dredging Co., Oakland, Cal.

Amount and character of work and price per unit: Dredge a cut 12 feet deep and 125 feet wide through rock reef and ocean bar; rock, 84 cents per cubic yard; sand, 20 cents per cubic yard, both place measurement; overdepth, one-half price for 1 foot.

Date of approval: February 24, 1916.

Date of beginning work: June 4, 1916.

Date of expiration: November 15, 1916.

Percentage of completion: None; actual dredging in cut commenced July 6, 1916.

COMMERCIAL STATISTICS.

There is no commerce through the inlet at the present time.

10. HARBOR AT MIAMI (BISCAYNE BAY), FLA.

Proposals for the construction of a dipper dredge for work on this improvement and that at St. Lucie Inlet, Fla.; also proposals for doing the dredging by contract, were opened November 8, 1915. All bids were rejected. It was decided that the work could best be done by contract. The adopted project, however, contemplated doing the work with a dredge to be constructed for the purpose, and further congressional action was necessary to authorize contract dredging. The action was taken in the river and harbor act of July 27, 1916.

On January 18, 1916, the Assistant Secretary of War accepted the evidence submitted by the city of Miami as satisfactory assurance that suitable terminal facilities will be provided, as required by the river and harbor act of July 25, 1912, as amended by the act of March 4, 1913, and authorized the expenditure of the funds available for the improvement.

A survey, for the purpose of obtaining the necessary data for the preparation of estimates of the quantities of material requiring removal in the work to be done by the Government at the entrance channel, began May 22, 1916, and was still in progress at the close of the fiscal year.

Of recent years, under natural influences, the condition of the channel at the New Cut entrance has materially improved. The depth over

the outer shoal in the line of the dredged channel is now not less than 9 feet. Formerly the least depth on this line was 6.3 feet. By turning to the eastward, as the ends of the jetties come abreast in going out, a depth of not less than 13 feet at mean low water can be carried to sea. The outer slope of the shoal at the entrance has advanced seaward about 350 feet.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 406).....	\$565,759.17
Present project:	
July 25, 1912.....	100,000.00
July 27, 1916.....	140,000.00
Total of appropriations.....	805,759.17
Returned to surplus fund of Treasury.....	34.49
Net total.....	805,724.68
Receipts from sales.....	2.50
Grand total.....	805,727.18

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Foreign.	Net registered tonnage.	Passengers.
Registered:				
Steamers.....	7,872	108	266,252	243,538
Sailing.....	580	108	41,340	300
Barges.....	4		1,548	
Unregistered:				
Steamers.....	2,910		13,205	30,700
Lighters.....	2,462		264,180	
Total.....	13,778	214	586,515	274,538

NOTE.—The above includes both arrivals and departures. In addition there are 200 fish boats running regularly and 90 large tourist yachts in the winter season.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Valuation.
Automobiles.....	263.....	175	\$262,500
Brick.....	225,000.....	45	24,750
Canned goods.....	71,680 boxes.....	1,792	358,400
Cement.....	37,725 barrels.....	7,545	71,632
Fish.....	38,420 barrels.....	3,851	308,230
Grain and hay.....	109,940 packages.....	5,497	164,910
Groceries.....	1,119 tons.....	1,119	219,800
Hardware and merchandise.....	3,561 tons.....	3,561	1,112,800
Lumber, pine.....	5,000,000 feet b. m.....	10,000	110,000
Miscellaneous.....	24,514 tons.....	24,514	395,101
Oranges and grapefruit.....	57,749 boxes.....	2,309	87,895
Oils:			
Crude.....	1,008 tons.....	1,008	16,000
Refined.....	1,000,176 gallons.....	3,223	209,495
Rock.....	211,173 tons.....	211,173	343,436
Sand.....	113,000 tons.....	113,000	88,250
Total.....		388,812	4,746,689

¹ Emergency allotment (act of Mar. 3, 1905) \$10,000, of which \$240.83 was returned to Treasury.

Number of regular steamers in the trade, 5.

Estimated percentage of total trade carried by water, 20 per cent.

Effect of improvement on freight rates, none.

Transportation lines established during 1915: One steamer line from Miami to Key West.

Transportation lines abandoned during 1915: Two schooner lines to Key West and P. & O. S. S. line to Nassau; the latter could not get in and out through the channel.

11. HARBOR AT KEY WEST, FLA.

There was no improvement work done in this harbor during the year other than the removal of a granite bowlder and an anchor in the upper harbor channel along the city water front. This work was done in November and December, 1915, at a cost of \$224.25. This expenditure was made from the funds available for improving main ship channel.

The sum of \$715.25 was expended from the funds available for improving northwest entrance for surveys, inspections, and other incidental expenses.

There have been no complaints regarding obstructing coral rock shoals and coral heads in the main ship channel, and the channel across the shoal at northwest entrance shows some improvement. The channel is nowhere less than 225 feet wide, and the least depth is 18.6 feet at mean low water.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 475) — \$52,500.00

Present project:

Sept. 19, 1890	\$40,000.00
July 13, 1892	75,000.00
Aug. 18, 1894	80,000.00
June 8, 1896	80,000.00
Mar. 8, 1899	25,000.00
June 6, 1900 (allotments of July 2, 1900, \$5,000;	
July 8, 1901, \$5,000; from emergency appropriation)	10,000.00
June 13, 1902	100,000.00
Mar. 8, 1905	50,000.00
Mar. 2, 1907	200,000.00
Feb. 27, 1911	25,000.00
July 25, 1912	63,000.00
Mar. 4, 1913	15,000.00
	<hr/> 763,000.00
Total of appropriations	815,500.00
Deduction on account of transfer under authority of river and harbor act approved Mar. 4, 1915	?
	<hr/> 35,000.00
Net total	780,500.00
Receipts from sales	58.50
Received from other sources	51.97
	<hr/> 780,610.47

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Steamers.....	2,820	90	2,910	2,672,060	36,684
Sailing.....	988	56	1,044	287,460	542
Barges.....	53	.....	53	42,400	.....
Unregistered:					
Steamers.....	300	.....	300	900	.....
Sailing.....	350	.....	350	3,500	.....
Lighters.....	330	.....	330	24,000	.....
Total.....	4,808	146	4,949	2,130,320	37,226

NOTE.—The above includes both arrivals and departures.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Bananas.....	59,000 bunches.....	900	\$25,000
Canned goods.....	51,480 cases.....	2,880	175,750
Cattle and live stock.....	7,600 head.....	1,470	280,000
Cigars.....	10,100 cases.....	620	2,000,000
Coal.....	50,000 tons.....	50,000	300,000
Coined gold.....	72 kegs.....	134	603,000
Dry goods, hats, shoes, etc.....	12,500 cases.....	11,300	655,000
Eggs.....	194,766 cases.....	4,650	1,065,128
Fertilizer.....	790 cars.....	20,571	822,840
Fish.....	15,500 barrels.....	1,500	145,000
Flour.....	67,000 barrels.....	6,346	385,000
Fruits (all kinds).....	1,977,385 packages.....	4,550	161,790
General merchandise.....	170,543 tons.....	170,543	3,579,222
Gold bullion.....	1,963 pounds.....	976	4,823,000
Grain and hay.....	90,819 packages.....	8,368	154,708
Horses (race).....	1,117 head.....	629	380,100
Ice.....	7,200 tons.....	7,200	56,000
Lumber:			
Cedar.....	500,000 feet b. m.....	1,000	50,000
Pine.....	28,888,245 feet b. m.....	30,000	606,501
Cypress.....	.....	2,568	107,856
Machinery (sugar mill, etc.).....	41,555 pieces.....	12,976	1,875,000
Miscellaneous merchandise.....	24,960 tons.....	24,960	725,500
Oils:			
Crude.....	122,000 barrels.....	19,200	153,600
Gasoline and light.....	115,560 barrels.....	22,000	577,500
Machine.....	6,150 barrels.....	1,290	27,500
Packing-house products.....	99,530 packages.....	12,191	2,232,700
Pineapples.....	210,000 crates.....	12,600	490,000
Railroad equipment, etc.....	23,291 tons.....	23,291	1,899,600
Rock, paving and roadway.....	365,800 tons.....	365,800	187,900
Sponges.....	3,816 bales.....	628	1,400,000
Sugar and sirup.....	5,000 tons.....	5,000	420,000
Tannin woods and bark.....	620 tons.....	620	60,800
Tobacco.....	4,120 packages.....	389	225,400
Vegetables.....	35,540 crates.....	1,377	50,000
Water, spring.....	2,100 carloads.....	230,400	40,000
Watermelons.....	75,000 melons.....	1,600	16,000
Total.....	.....	1,069,177	27,308,196

Number of regular steamers in the trade, 18.

Estimated percentage of total trade carried by water, 80 per cent.

Effect of improvement on freight rates, none.

Transportation lines abandoned during 1915: Two schooner lines to Miami.

Transportation lines established during 1915: One steamer line to Miami and one car-ferry line to Havana.

12. KISSIMMEE RIVER, FLA.

No work was done on this improvement during the fiscal year. Nothing effective could be accomplished with the funds available.

The expenditures were for liabilities incurred during previous year and for inspection.

APPROPRIATIONS.

June 13, 1902.....	\$8,000.00
Mar. 3, 1905.....	7,000.00
Mar. 3, 1905 (allotment May 21, 1909, from emergency appropriation).....	600.00
Mar. 2, 1907.....	12,221.00
June 25, 1910.....	5,000.00
July 27, 1916.....	8,000.00
Total of appropriations.....	35,821.00
Receipts from sales.....	92.85
Total.....	35,913.85

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Registered steamers.....	800	12,900	5,000
Unregistered:			
Lighters.....	900	50,560	.....
Rafts.....	152	10,000	.....
Total.....	1,852	73,460	5,000

NOTE.—The above includes both arrivals and departures. In addition, there are 150 small launches.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.
				Miles.
Crate material.....	27,500 packages.....	750	\$18,000	20
Fertilizer.....	4,000 bags.....	400	14,000	.....
Fish.....	5,000 barrels.....	500	40,000	20
Gasoline and oils.....	968 barrels.....	200	12,000	.....
Grain and hay.....	45,000 packages.....	2,250	55,750	30
Grapefruit and oranges.....	275,000 boxes.....	11,000	330,000	20
Groceries, etc.....	2,000 tons.....	2,000	60,000	20
Hides and skins.....	25 tons.....	25	1,875	.....
Ice.....	1,000 tons.....	1,000	8,000	20
Logs, pine.....	2,500,000 feet b. m.....	10,000	20,000	.....
Lumber, pine.....	12,000,000 feet b. m.....	25,000	144,000	.....
Miscellaneous.....	2,130 tons.....	2,130	251,520	.....
Naval stores:				
Turpentine.....	2,500 barrels.....	500	45,000	30
Rosin.....	7,500 barrels.....	1,500	45,000	30
Railroad supplies.....	100 tons.....	100	2,000	.....
Sand.....	200 tons.....	200	300	Local.
Vegetables.....	40,000 crates.....	1,000	40,000	20
Wood.....	8,350 cords.....	15,000	60,000	.....
Wool.....	10 tons.....	10	5,000	.....
Total.....		73,565	1,164,045	.....

Number of regular steamers in the trade, 4.

Estimated percentage of total trade carried by water, 75 per cent.

Effect of improvement on freight rates, none.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

13. CALOOSAHATCHEE RIVER, FLA.

The U. S. snag boat *Kissimmee* was repaired and put in commission and began work on the stream September 7, 1915, at a point 59 miles above the mouth of the river, near LaBelle. This work continued until January 27, 1916. The river was cleared of obstructions between points 38.5 and 59 miles, respectively, above the mouth of the river. A total of 1,938 snags and 1,451 overhanging trees were removed at a cost of \$4,554.03. The sum of \$295.51 was expended for inspections, examinations, and incidentals.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 418) - \$14,000.00

Present project:

Aug. 11, 1888.....	\$10,000.00
Sept. 19, 1890.....	3,600.00
July 13, 1892.....	1,000.00
Aug. 18, 1894.....	2,000.00
June 8, 1896.....	1,000.00
Mar. 8, 1899.....	2,000.00
June 13, 1902.....	1,500.00
Mar. 2, 1907 (allotted from emergency appropriation).....	3,000.00
Mar. 8, 1905 (allotted).....	2,000.00
Mar. 3, 1905 (emergency allotment).....	2,000.00
Mar. 8, 1905.....	2,000.00
Mar. 8, 1909 (allotted).....	400.00
June 25, 1910.....	50,000.00
June 25, 1910 (emergency allotment).....	6,000.00
Feb. 27, 1911.....	69,000.00
July 25, 1912.....	5,000.00
Mar. 4, 1913.....	2,000.00
Mar. 4, 1913 (emergency allotment).....	8,473.00
Oct. 2, 1914 (allotted).....	2,000.00
Mar. 4, 1915 (allotted).....	5,000.00
July 27, 1916.....	3,000.00
	<hr/> 180,973.00

Total of appropriations 184,973.00

Receipts from sales..... 1.05

Grand total..... 184,974.05

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered steamers.....	2,418	122,358	12,027
Unregistered:			
Steamers.....	2,788	13,443	14,076
Lighters.....	2,047	206,940	
Rafts.....	6	800	
Total.....	7,259	343,581	26,103

NOTE.—The above includes both arrivals and departures. In addition, there are about 250 launches on the river. Between Fort Denard and LaBelle the freight is transferred to and handled on shallow-draft lighters.

¹ Allotment of \$10,000 of which \$1,527 was returned to the Treasury to the credit of the appropriation.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Cattle.....	6,510 head.....	1,365	\$171,000	Export.....	
Crate material.....	271,266 packages.....	3,428	72,840	30	3.3
Fertilizer.....	30,750 sacks.....	3,075	92,250	30	5.0
Fish and oysters.....	5,000 barrels.....	500	24,000	50	
Gasoline and oils.....	4,849 barrels.....	1,004	65,260	30	
Grape fruit and oranges.....	193,500 boxes.....	7,740	232,200	30	8.3
Hogs.....	300.....	15	1,950	20	
Ice.....	738 tons.....	738	4,638	50	
Lega pine.....	355,000 feet b. m.....	800	3,550	Local.....	
Lumber, pine.....	736,000 feet b. m.....	1,472	10,040	20	
Miscellaneous.....	15,679 tons.....	15,679	1,019,135	30	6.6
Naval stores:					
Turpentine.....	1,340 barrels.....	302	27,180	45	
Rosin.....	16,040 barrels.....	4,010	120,300	45	
Shell.....	28,265 tons.....	28,265	35,331	10	
Vegetables.....	97,350 crates.....	1,947	100,350	30	6.6
Total.....		69,340	1,980,014		

Divided as follows: Above Fort Myers, 22,235 tons; below Fort Myers, 45,714 tons; opposite Fort Myers, 41,543 tons.

Number of regular steamers in the trade, 16, and 5 launches.

Effect of improvement on freight rates, none.

Estimated percentage of total trade carried by water, 90 per cent.

Transportation lines established during 1915: A steamer line from Fort Myers to Fort Denaud.

Transportation lines abandoned during 1915, none.

14. ORANGE RIVER, FLA.

No work was done on this improvement during the fiscal year and no expenditure was made.

APPROPRIATIONS.

June 13, 1902 (allotted).....	\$2,000
Mar. 8, 1905 (allotted).....	1,000
Mar. 2, 1907 (allotted).....	1,000
Mar. 8, 1909 (allotted).....	600
June 25, 1910.....	1,500
Mar. 4, 1913.....	1,000
July 27, 1916.....	1,000
Total.....	8,100

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Registered steamers.....	776	14,400	.....
Unregistered steamers.....	20	80	231
Total.....	796	14,480	231

NOTE.—The above includes both arrivals and departures. In addition, there are about 50 launches on the river.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Citrus fruits.....	54,018 boxes.....	2,160	\$64,800	9	28
Fertilizer.....	12,500 bags.....	630	36,500	9	17
Miscellaneous.....	700 tons.....	700	42,000	9	22
Total.....	.....	3,490	143,300	.....	.....

Number of regular steamers in the trade, 2.

Estimated percentage of total trade carried by water, 50 per cent.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

15. CHARLOTTE HARBOR, FLA.

No work was done on this improvement during the fiscal year and no expenditure was made.

APPROPRIATIONS.

GOVERNMENT FUNDS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 422).....	\$103,000
Present project:	
July 25, 1912.....	\$20,000
Mar. 4, 1913.....	4,000
	24,000
Total of United States funds.....	130,000

CONTRIBUTED FUNDS.

Oct. 25, 1912 (contributed by local interests).....	20,000
Grand total.....	150,000

Commercial statistics.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Steamers.....	1,322	36	1,358	400,098	7,500
Sailing.....	6	.....	6	7,060	.....
Unregistered:					
Steamers.....	3,376	.....	3,376	9,392	4,190
Lighters.....	72	.....	72	14,000	.....
Total.....	4,776	36	4,812	430,570	11,690

NOTE.— The above includes both arrivals and departures. In addition there are 300 boats in the fish trade and 120 more privately owned. Of the above amount 389,070 registered tons is confined to the entrance at Boca Grande.

¹ Increased by \$6,000, appropriated and expended on Pine Island Sound.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Coal.....	5,746 tons.....	5,746	\$28,780
Crate material.....	9,609 packages.....	180	3,600
Fertilizer.....	200 bags.....	20	12,000
Fish.....	40,415 barrels.....	4,041	247,580.
Ice.....	6,872 tons.....	6,872	27,488
Lumber, pine.....	272,550 feet b. m.....	546	4,068
Miscellaneous.....	2,178 tons.....	2,178	66,924
Oils, etc.....	212,700 gallons.....	608	51,048
Oranges, etc.....	25,000 boxes.....	100	20,000
Oyster shell, paving.....	3,000 barrels.....	300	480
Phosphate.....	323,225 tons.....	323,225	1,616,125
Railroad supplies.....	100 tons.....	100	3,000
Vegetables.....	5,000 crates.....	100	5,000
Wood.....	600 cords.....	1,000	2,400
Wood-preserved oils.....	513,575 gallons.....	2,262	50,806
Total.....		347,368	2,149,358

Divided as follows: Export and import through Boca Grande Pass, 381,809 short tons; Charlotte Harbor, at Punta Gorda, 15,459 short tons.

Number of regular steamers in the trade, 7 launches.

Estimated percentage of total trade carried by water, 75 per cent.

Effect of improvement on freight rates: None locally, but it has caused a reduction of rates on phosphate shipments from the mines to other export terminals.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

16. SARASOTA BAY, FLA.

No work was done on this improvement during the fiscal year. A channel of project depth and width exists from Tampa Bay to Sarasota. The channel from Sarasota to Venice is reported to have shoaled at several points. An investigation will be made, and maintenance work will be undertaken if it is found that the requirements of commerce demand it.

The expenditures were for an examination and for a portion of the cost of the care and repair of the dredge *Sarasota*.

APPROPRIATIONS.

Sept. 19, 1890.....	\$5,000.00
July 18, 1892.....	2,500.00
Aug. 18, 1894.....	2,500.00
June 8, 1896.....	2,500.00
Mar. 8, 1899.....	5,000.00
June 13, 1902.....	5,000.00
Mar. 3, 1905.....	5,000.00
Mar. 3, 1905 (allotted Jan. 27, 1906, from emergency appropriation).....	5,000.00
Mar. 2, 1907.....	22,500.00
Mar. 2, 1907 (allotted Nov. 2, 1906, from emergency appropriation).....	3,000.00
Mar. 3, 1909.....	5,000.00
Mar. 3, 1909 (allotted Dec. 31, 1906, from emergency appropriation).....	4,000.00
June 25, 1910.....	30,000.00
July 25, 1912.....	13,000.00
Mar. 4, 1913.....	13,000.00
July 27, 1916.....	2,500.00
Total of appropriations.....	125,500.00
Receipts from sales.....	2,042.75
Total.....	127,542.75

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	1,951	18,208	1,206
Sailing.....	95	665	.....
Unregistered:			
Steamers.....	800	1,408	280
Lighters.....	1,000	4,000	.....
Total.....	3,746	24,336	1,516

NOTE.—The above includes both arrivals and departures. In addition, there are approximately 160 undertonnage launches on the bay that carry many thousand passengers.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				Miles.	Cents.
Fish.....	9,285 barrels.....	899	\$69,828	12	.....
Fruit and vegetables.....	150 tons.....	150	7,500	52	.....
Gasoline:					
Bulk.....	132,200 gallons.....	285	25,025	52	.....
Drums.....	1,600 drums.....	332	21,580	12	.....
Ice.....	1,220 tons.....	1,220	6,320	12	.....
Miscellaneous.....	5,308 tons.....	5,308	361,835	40	7.3
Plants and shrubs.....	350 tons.....	350	102,000	10	.....
Total.....		8,554	585,068	.....	.....

Number of regular steamers in the trade, 2; and 5 launches additional.

Estimated percentage of total trade carried by water, 15 per cent.

Effect of improvement on freight rates: 20 per cent less than at other towns where there is no competition.

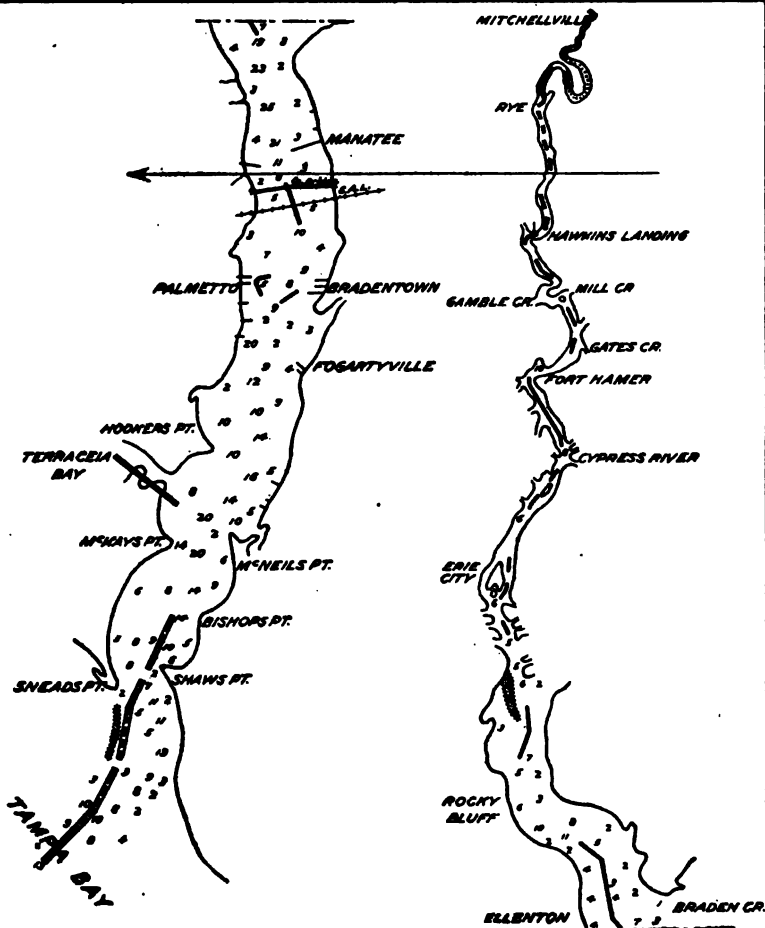
Transportation lines established during 1915: One, the Favorite Line to Tampa and St. Petersburg.

Transportation lines abandoned during 1915: One, the Sarasota Transportation Co. to St. Petersburg.

17. MANATEE RIVER, FLA.

Dredging with the U. S. dredge *Barnard*, to complete the project channel between Tampa Bay and McNiels Point, in progress at the beginning of the fiscal year, was completed August 17, 1915, except for a distance of about 200 feet where rock was found, about midway between the outer and inner ends of the dredged channel, which extends about $3\frac{1}{2}$ miles from Tampa Bay. The channel was made 100 feet wide. A least depth of 12 feet was obtained over the rock area. Elsewhere the depth obtained was not less than 13 feet. A total of 157,609 cubic yards of material, consisting of sand and shell and a small amount of rock, was removed by this dredge during the year at a field cost of \$17,124.36, or 10.86 cents per cubic yard.

Maintenance work with the U. S. dredge *Sarasota* in progress in Terra Ceia cut-off at the beginning of the fiscal year was completed



July 16, 1915. The channel was restored to project dimensions, except for a length of 600 feet at the southern end, where full depth does not exist along the edges of the cut. In this work the dredge removed 5,730 cubic yards of material, at a field cost of \$824.10, or 14.88 cents per cubic yard.

Following urgent complaints regarding the condition of the river between Rye and the bridge at Mitchellville, which portion of the stream it had been decided was not properly included in the project on September 24, 1915, the Acting Secretary of War authorized the expenditure of \$500 from the funds available for this improvement for work in the river above Rye. Parties interested in the improvement towed the U. S. dredge *Sarasota*, without cost to the United States, from the Anclote River, where she was working, to the upper Manatee River and back to the Anclote River, on completion of the dredging. The dredge worked here from October 14 to October 19, 1915. Two days were spent in work below Rye and four days in work above Rye. A total of 6 snags and 595 cubic yards of material were removed from two shoals aggregating 250 feet in length below Rye and 41 snags and 1,295 cubic yards of material from three shoals, aggregating 445 feet in length, above Rye. The result was a controlling depth of 8 feet at mean low water and a width of 30 feet below Rye, and a controlling depth of 2½ feet at mean low water and a width of 25 feet from Rye to the bridge at Mitchellville. The sum of \$351.67 was expended on the work above Rye at this time.

The dredge *Sarasota* resumed work above Rocky Bluff January 12, 1916, and continued dredging between Rocky Bluff and a point about one-half mile above Brownings Landing, until March 22, 1916. During this time the dredge removed 31,237 cubic yards of soft material from 8 shoals, and 239 snags and overhanging trees. The remainder of the allotment of \$500, for work above Rye, amounting to \$148.33, was expended at this time on the work done above Brownings Landing at Rye.

The total amount removed by the dredge *Sarasota* above Rocky Bluff during the year was 33,127 cubic yards at a field cost of \$2,798.56, or 8.44 cents per cubic yard.

The result of the work done is an available channel not less than 50 feet wide and 4 feet deep at mean low stage from Rocky Bluff to a point 7,500 feet below the bridge at Mitchellville. Between that point and the bridge, where no dredging has been done in recent years, four or five shoals exist, having a controlling depth of 2.5 feet at mean low stage.

APPROPRIATIONS.

Aug. 2, 1882-----	\$12,000.00	Mar. 4, 1918-----	\$5,000.00
Aug. 5, 1886-----	11,000.00	Mar. 4, 1915 (allotted)---	35,000.00
Aug. 11, 1888-----	5,000.00	July 27, 1916-----	5,000.00
Sept. 19, 1890-----	6,000.00		
July 13, 1892-----	6,000.00	Total of appropria-	
Aug. 18, 1894-----	3,000.00	tions-----	200,108.87
Aug. 23, 1894 (claim)---	58.87	Covered into surplus fund	
June 3, 1896-----	4,000.00	of Treasury-----	58.87
Mar. 8, 1899-----	10,000.00		
June 13, 1902-----	2,342.00	Net total-----	200,052.00
Mar. 8, 1905-----	10,000.00	Receipts from sales-----	8.80
Mar. 2, 1907-----	70,710.00		
Mar. 3, 1909 (allotment)---	10,000.00	Grand total-----	200,060.80
July 25, 1912-----	5,000.00		

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Registered steamers.....	2,562	385,628	136,594
Unregistered:			
Steamers.....	12,380	41,580	¹ 42,000
Lighters.....	112	8,420	
Rafts.....	80	2,160	
Total.....	14,838	466,400	178,594

¹ Estimated.

NOTE.—The above includes both arrivals and departures. In addition, there are about 80 undertonage launches on the river.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				Miles.	Cents.
Cement.....	340 barrels.....	68	\$578	35	
Crate material.....	12,000 packages.....	240	5,760		
Fuller's earth.....	8 ¹ / ₂ 254 sacks.....	6,972	12,960	35	3.1
Logs, pine.....	720,000 feet b. m.....	2,160	6,480	12	
Lumber, pine.....	175,000 feet b. m.....	350	2,625	25	
Miscellaneous.....	15,932 tons.....	15,932	938,220	35	.12
Naval stores:					
Turpentine.....	418 barrels.....	97	8,730	50	6.6
Rosin.....	696 barrels.....	174	5,220	50	6.6
Fertilizer.....	800 sacks.....	40	1,600		
Fruits and vegetables.....	210,800 crates.....	4,218	210,800	35	
Oils and gasoline.....	210,000 gallons.....	656	42,640	35	
Oranges.....	20 000 boxes.....	800	24,000	35	.1
Sand.....	10,000 cubic yards.....	7,700	7,700	10	
Wood.....	1,420 cords.....	2,414	9,656	12	
Watermelons.....	10 tons.....	10	100		
Total.....		41,829	1,277,069		

Divided as follows: Above Manatee, 15,443; below Bradentown, 26,386.

Number of regular steamers in the trade, 2, and 5 launches additional.

Estimated percentage of total trade carried by water, 20 per cent.

Effect of improvement on freight rates: They are 20 per cent less than at other towns where there is no water competition.

Transportation lines established during 1915, none..

Transportation lines abandoned during 1915, none.

18. TAMPA BAY, FLA.

No work was done on this improvement during the fiscal year, and no expenditure was made.

The funds available are held for maintenance of improvement when necessary. The work required has not been sufficiently urgent to warrant sending suitable plant to this locality.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 562) — \$180,000.00

Present project:

Mar. 8, 1899	\$75,000.00
June 6, 1900	185,000.00
Mar. 8, 1901	127,000.00
June 28, 1902	86,675.00
Mar. 8, 1903	186,837.76
Mar. 8, 1909	20,000.00
June 25, 1910	9,000.00
Feb. 27, 1911	9,000.00
July 25, 1912	9,000.00
Mar. 4, 1913	9,000.00
Oct. 2, 1914 (allotted)	6,000.00
July 27, 1916	6,000.00
	678,012.76

Total of appropriations — 808,012.76
 Receipts from sales — 11.70

Grand total — 808,024.46

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Ameri- can.	Foreign.	Total.	Net ton- nage.	Deep sea total, Port Tampa.	Deep sea net ton- nage, Port Tampa.
ARRIVALS.						
Steamers	2,018	55	2,073	1,086,637	283	323,987
Naval vessels	9		9			
Sailing vessels	535	26	561		6	6,290
Launches	2,220		2,220			
Unrigged	2,275		2,275		35	31,024
Barks		1	1	1,248		
Total	7,067	82	7,139	1,445,556	324	361,301
DEPARTURES.						
Steamers	2,017	54	2,071	1,080,879	298	348,806
Naval vessels	9		9			
Sailing vessels	542	32	574		20	23,211
Launches	2,220		2,220			
Unrigged	2,276		2,276		36	31,847
Barks		1	1	1,248		
Total	7,064	87	7,151	1,441,070	354	403,864

Total number of passengers handled, 168,534.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	6,240,000.....	25,680	\$152,240
Cattle.....	200 head.....	100	10,000
Cement.....	130,175 barrels.....	26,035	214,624
Coal.....	115,421 tons.....	115,421	692,526
Cigars.....	21,925 cases.....	877	4,385,000
Fertilizer.....	1,690 bags.....	169	6,760
Fish and oysters.....	10,500 barrels.....	1,000	11,355
Flour.....	265,180 barrels.....	10,620	637,740
Fruits.....	649,950 crates.....	25,998	779,940
Fuller's earth.....	89,244 bags.....	6,972	129,940
Grain.....	96,500 bags.....	4,825	144,750
Ice.....	6,196 tons.....	6,196	30,980
Logs, cedar.....	1,165,787 feet b. m.....	1,457	35,000
Lumber:			
Cedar.....	2,366 feet b. m.....	2	150
Pine.....	34,352,715 feet b. m.....	94,470	680,000
Cypress.....	2,926,000 feet b. m.....	8,047	146,300
Miscellaneous.....	585,018 tons.....	585,018	20,082,203
Oils:			
Fuel.....	38,104,000 gallons.....	142,890	857,890
Refined.....	26,766,000 gallons.....	88,865	5,666,225
Phosphate.....	526,203 tons.....	526,203	2,631,015
Sand.....	64,982 tons.....	64,982	64,982
Shell.....	65,376 tons.....	65,376	81,720
Sugar.....	39,138 barrels.....	6,523	847,990
Water.....	4,486,475 gallons.....	20,675	15,500
Wood.....	649 cords.....	1,100	4,400
Total.....		1,829,540	44,319,230

NOTE.—Commercial statistics furnished by the Tampa Board of Trade.

The totals reported for Tampa Bay include commerce of Old Tampa Bay (Port Tampa) and Hillsboro Bay (Tampa), divided as follows: Port Tampa Channel, 578,513 short tons; Hillsboro Bay Channel, 1,251,027 short tons.

Number of regular steamers in the trade, 22.

Estimated percentage of the total trade carried by water, 50 per cent.

Effect of the improvement upon freight rates: Has lowered them 20 per cent.

Transportation lines established during 1915: One steamer line to Sarasota.

Transportation lines abandoned during 1915: One launch line to Sarasota.

Of the total commerce above reported, the deep-sea tonnage utilizing the deep channel in Tampa and Hillsboro Bays was 1,665,545 short tons. The remainder was bay and river tonnage.

Summary of commerce of Tampa, 1915.

[Furnished by Tampa Board of Trade.]

	Total ves- sels arrived and departed.	Total net tonnage of arrivals and departures.	Total com- merce handled.	Total value of commerce.
			<i>Short tons.</i>	
1. Hillsboro River.....	12,735	908,750	383,077	\$11,889,726
2. Hillsboro Bay (deep-sea commerce).....	912	1,220,251	1,067,032	24,869,112
3. Hillsboro Bay (including both of above without duplication).....	13,613	2,221,461	1,251,027	34,869,112
4. Old Tampa Bay (Port Tampa or Atlantic Coast Line terminals).....	678	765,165	578,513	9,620,118
5. Deep-sea commerce, Port of Tampa (Nos. 2 and 4).....	1,590	1,985,416	1,665,545	34,519,230
6. Total commerce of port of Tampa (including Nos. 3 and 4).....	14,200	2,886,626	1,829,540	44,319,230

19. HARBOR AT ST. PETERSBURG, FLA.

The work of placing stone in the jetty on the south side of the entrance to this harbor, in progress at the close of the last fiscal year, continued until July 14, 1915, when funds available for this purpose

were exhausted. During this time 490 tons of Florida limestone was placed in the work, building the portion between points 655 feet and 825 feet, respectively, from the inner end of the jetty to a crest height of 3 feet above mean low water, with side slopes of about 1 on 1 on the inner slope and 1 on 1½ on the outer slope. No granite capping has yet been placed. The stone was placed with hired labor using two leased lighters. At the contract price of \$1.55 per ton, the stone cost \$759.50. The cost of placing this stone amounted to \$364.75, making the total cost of the stone placed during the year \$1,124.25, or \$2.29 per ton.

The dredged channel has shoaled somewhat and maintenance dredging is needed to restore it to project dimensions. The ruling depth is now 8.8 feet at mean low water.

The city of St. Petersburg dredged the inner harbor and the communicating slip 200 feet wide to depths in excess of 10 feet at mean low water and constructed a concrete wharf 300 feet long on the northeasterly side of the slip during the year. Shoaling has occurred in the areas dredged by the city also, and the ruling depth is 8.3 feet at mean low water.

The sum of \$978.28 was expended from funds available for this improvement to defray a portion of the cost of constructing the dredge *Sarasota*.

APPROPRIATIONS.

July 25, 1912.....	\$52,000
Mar. 4, 1913.....	1,500
Oct. 2, 1914 (allotted).....	1,500
Mar. 4, 1915 (allotted).....	1,500
July 27, 1916.....	14,500
Total.....	51,000

CONTRACTS IN FORCE.

Contractor: R. L. Nunn, Brooksville, Fla.

Amount and character of material and price per unit: Furnishing 2,000 tons of stone at \$1.55 per ton.

Date of contract: April 1, 1915 (emergency).

Date of beginning work: May 1, 1915 (about).

Date of expiration: June 11, 1915, and extended for reasonable period.

Completed July 14, 1915.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Not registered tonnage.	Passengers.
Registered steamers.....	3,174	57,132	137,389
Unregistered lighters.....	80	3,009	.....
Total.....	3,254	60,132	137,389

NOTE.—The above includes both arrivals and departures. In addition, there are approximately 100 launches in the harbor.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.
Brick.....	305 tons.....	305	\$2,880	<i>Miles.</i> 23
Cement.....	37,600 bags.....	1,782	14,682	23
Fish.....	11,080 barrels.....	1,108	88,960	15
Gasoline:				
Bulk.....	600,000 gallons.....	1,880	144,000	8
Barrels.....	11,325.....	2,247	134,919	8
Fertilizer.....	8,000 bags.....	400	15,000	22
Hardware.....	260 tons.....	260	80,000	23
Lumber.....	320,000 feet b. m.....	480	7,200	22
Miscellaneous.....	7,478 tons.....	7,478	196,082	23
Pipe (cast iron).....	480 tons.....	480	27,600	1,000
Total.....		16,486	679,623	

Number regular steamers in the trade, 10.

Estimated percentage of total trade carried by water, 5 per cent.

Effect of improvement on freight rates, none.

Transportation lines established during 1915: One freight boat to Tampa; one freight and passenger boat to Sarasota.

Transportation lines abandoned during 1915: One to Pass-a-Grille and one to Sarasota.

20. HILLSBORO BAY, FLA.

Work in progress at the close of the last fiscal year under the contract with the Standard American Dredging Co., of Galveston, Tex., continued until April 21, 1916, when it ceased temporarily, owing to needed repairs to the contractor's plant and pending other arrangements for continuing the work. During the current fiscal year a total of 384,047 cubic yards of rock and other material was removed to a depth of 24 feet, and 122,925 cubic yards between depths of 24 and 26 feet from Hendry and Knight Channel, Ybor turning basin, Ybor Channel, and Tampa Northern Channel. The quantities given are closely approximate. The final computations have not yet been concluded. Based on the figures given, at contract prices, this work cost \$262,850.61. The result of the work was the completion to project depth of about 85 per cent of Ybor Channel, the completion of Hendry and Knight Channel, except where maintenance work only was required, the completion of Ybor turning basin, excepting a small area at its southern end and the extension of the area, which had previously been dredged for a distance of 2,100 feet in the southern portion of Tampa Northern Channel, a further distance of 1,800 feet northerly. This additional area was dredged to project depth for a width of 150 feet along the easterly side of the channel.

The U. S. dredge *Barnard* was extensively repaired and refitted and supplied with additional pipe and appliances, at a total cost, including the sea trip to the yards at Charleston and return, of \$25,656.08. She then began dredging in Ybor Channel on March 24, 1916. At the close of the year this dredge had removed 264,078 cubic yards of soft material, mixed with tough clay and loose rocks, in Ybor, Hendry and Knight, Tampa Northern, and Sparkman Bay Channels, at a field cost of \$30,673.38, or 11.61 cents per cubic yard. Including care, repairs, and operating expenses the *Barnard* cost

\$52,202.67, making the gross cost of her work 19.8 cents per cubic yard. The depths obtained by this dredging were 18 to 26 feet in Ybor Channel, 23 to 26 feet in Hendry and Knight Channel, 8 to 12 feet in Tampa Northern Channel, and 10 to 25 feet in Sparkman Bay Channel. The *Barnard* in its present condition is not suited for rock dredging, and the depths obtained were limited by the ledge rock encountered. At the close of the year a pattern for a toothed rock cutter was being made. It is hoped more satisfactory work in rock will be accomplished with the new cutter, especially if the dredge is equipped with a more powerful cutter engine and the ladder is strengthened.

Office expenses, supervision, and contingencies cost \$27,606.40 during the year.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 463) —	\$739,944.00
Present project:	
June 25, 1910.....	\$300,000.00
Feb. 27, 1911.....	300,000.00
July 25, 1912.....	250,000.00
Aug. 24, 1912 (sundry civil act).....	200,000.00
Mar. 4, 1913.....	200,000.00
June 23, 1913 (sundry civil act).....	100,000.00
Mar. 4, 1915 (allotted).....	225,000.00
July 27, 1916.....	825,000.00
	<hr/> 1,900,000.00
Total of appropriations.....	2,639,944.00
Receipts from sales.....	2,000.95
	<hr/> Grand total.....2,641,950.95

CONTRACTS IN FORCE.

Contractor: Standard American Dredging Co., Galveston, Tex.

Amount and character of material and price per unit: Removing 500,000 or more cubic yards of material at 59 cents, measured in place; one-half price for material removed not over 2 feet below required depth. Limit, \$500,000.

Date of approval: January 17, 1914.

Date of beginning work: April 28, 1914 (extended to July 28, 1914).

Date of expiration: About August 10, 1916.

Percentage of completion at end of fiscal year: 99.

Contractor: Tampa Coal Co., Tampa, Fla.

Amount and character of material and price per unit: 3,000 long tons of coal, at \$5.75 per ton.

Date of approval: August 4, 1915.

Date of beginning work: July 1, 1915.

Date of expiration: September 30, 1915.

Completed.

Contractor: Alabama Fuel & Iron Co., Birmingham, Ala.

Amount and character of material and price per unit: 2,000 short tons coal; base rate, \$1.40 f. o. b. cars at mines.

Date of contract: April 10, 1916 (emergency).

Date of beginning work: April 10, 1916.

Date of expiration: June 30, 1916.

Completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Ameri- can.	Foreign.	Total.	Net tonnage.
ARRIVALS.				
Steamers.....	1,760	21	1,780	732,650
Naval vessels.....	9		9	
Sailing vessels.....	526	28	554	50,283
Launches.....	2,220		2,220	45,000
Unrigged.....	2,240		2,240	225,074
Barks.....		1	1	1,248
Total.....	6,767	48	6,815	1,084,255
DEPARTURES.				
Steamers.....	1,753	20	1,773	732,073
Naval vessels.....	9		9	
Sailing vessels.....	522	32	554	34,469
Launches.....	2,220		2,220	45,000
Unrigged.....	2,240		2,240	224,416
Barks.....		1	1	1,248
Total.....	6,744	53	6,797	1,087,206

Passengers carried, 153,522.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Valuation.
Brick.....	6,240,000.....	25,680	\$152,240
Cattle.....	200 head.....	100	10,000
Cement.....	130,175 barrels.....	28,015	214,624
Coal.....	107,080 tons.....	107,080	642,480
Cigars.....	21,925 cases.....	877	4,285,050
Fertilizer.....	1,660 bags.....	166	6,760
Fish and oysters.....	10,500 barrels.....	1,050	11,255
Flour.....	265,180 barrels.....	10,629	637,740
Fruits.....	649,959 crates.....	26,998	779,940
Fuller's earth.....	89,254 bags.....	6,972	139,940
Grains.....	96,500 bags.....	4,825	144,750
Ice.....	6,196 tons.....	6,196	29,980
Logs, cedar.....	1,165,767 feet b. m.....	1,457	35,000
Lumber:			
Cedar.....	2,868 feet b. m.....	2	150
Pine.....	34,353,715 feet b. m.....	94,470	690,030
Cypress.....	2,924,000 feet b. m.....	8,047	146,300
Miscellaneous.....	538,537 tons.....	526,537	22,863,617
Oils:			
Fuel.....	4,022,000 gallons.....	17,253	103,518
Refined.....	7,500,000 gallons.....	26,250	1,708,250
Phosphate.....	200,774 tons.....	200,774	1,608,870
Sand.....	64,982 tons.....	64,982	64,982
Shell.....	65,376 tons.....	65,376	81,720
Sugar.....	39,138 tons.....	6,523	847,920
Water.....	4,466,475 gallons.....	20,675	18,506
Wood.....	649 cords.....	1,160	4,400
Total.....		1,251,027	34,089,112

NOTE.—Commercial statistics furnished by Tampa Board of Trade.

Number of regular steamers in the trade, 20, and many small boats.

Estimated percentage of total trade carried by water, 60 per cent.

Effect of improvement upon freight rates: Has lowered rail rate 40 per cent.

Transportation lines established during 1915: One steamer line to Sarasota, via St. Petersburg.

Transportation lines abandoned during 1915: One launch line from Tampa to Sarasota.

21. HILLSBORO RIVER, FLA.

No work was done on this improvement during the year. The money expended was for a portion of the cost of constructing the dredge *Sarasota*.

APPROPRIATIONS.

June 25, 1910.....	\$25,000
July 27, 1916.....	6,500
Total of appropriations.....	31,500
Transferred under river and harbor act of Mar. 4, 1915	6,500
Net total.....	25,000

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Trips.	Net registered tonnage.	Passengers.
Launches.....	36	4,440	90,000	.....
Sailing vessels.....	58	920	15,750	.....
Steam vessels.....	10	2,900	350,000	.....
Unrigged vessels.....	30	4,475	450,000	.....
Total.....	164	12,735	908,750	145,200

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Cement.....	23,000 barrels.....	4,600	\$39,100
Coal.....	13,500 tons.....	13,500	92,500
Fish.....	7,650 barrels.....	765	7,650
Fruits.....	475,000 crates.....	19,000	475,000
Fuller's earth.....	1,500 tons.....	1,500	30,000
Ice.....	6,196 tons.....	6,196	30,980
Lega, cedar.....	500,000 feet b. m.....	1,400	35,000
Lumber, pine.....	4,162,115 feet b. m.....	11,448	83,240
Miscellaneous.....	137,000 tons.....	137,000	4,851,000
Oils, light, etc.....	11,500,000 gallons.....	40,250	1,026,000
Oysters.....	2,350 barrels.....	285	3,705
Sand.....	64,982 tons.....	64,982	64,982
Shell.....	65,376 tons.....	65,376	81,720
Water.....	4,486,475 gallons.....	20,675	15,506
Wood.....	640 cords.....	1,100	4,400
Total.....	.....	393,077	6,756,533

NOTE.—Commercial statistics furnished by Tampa Board of Trade. Average distance carried and rate per ton-mile: The improvement is in the nature of a terminal for the city of Tampa. The commerce is local and there are no rates on the river.

Number of regular steamers in the trade, 10, and several launches.

Estimated percentage of total trade carried by water, 60 per cent, including Hillsboro Bay.

Effect of the improvement on freight rates: Has caused a reduction of 40 per cent in rail rates.

Transportation lines established during 1915: One steamer line to Sarasota.

Transportation lines abandoned during 1915: One launch line to Osprey.

22. CHANNEL FROM CLEARWATER HARBOR THROUGH BOCA CEIGA BAY TO TAMPA BAY, FLA.

Maintenance work with the dredge *Sarasota* was in progress from July 21 until September 8, 1915. During this time a total of 19,681 cubic yards of material was removed from two shoals near and south of Indian Pass and from three shoals near and north of The Narrows, restoring the channel at these localities to project dimensions. From December 80, 1915, until January 8, 1916, the dredge worked on a shoal in The Narrows, where maintenance work was needed and where a small amount of rock was found within the channel limits. A total of 185 cubic yards of rock and 250 cubic yards of soft material was removed from this locality. On January 6 and 7, 1916, the dredge did maintenance work on a shoal at the northerly end of Boca Ceiga Bay, removing 1,435 cubic yards of material from this locality. During the year the dredge *Sarasota* removed a total of 185 cubic yards of rock and 21,366 cubic yards of soft material in work on this improvement, at a field cost of \$2,826.52 or \$2 per cubic yard for rock and 11.49 cents per cubic yard for soft material.

The work during the year restored defective reaches in the channel to project dimensions, excepting one place over rock, in The Narrows, where a depth of 4.3 feet was all that could be secured.

APPROPRIATIONS.

June 25, 1910.....	\$29,500
Feb. 27, 1911.....	29,500
July 25, 1912.....	20,000
Mar. 4, 1913.....	3,000
Oct. 2, 1914 (allotted).....	12,000
Mar. 4, 1915 (allotted).....	3,000
July 27, 1916.....	8,000
Total.....	100,000

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
American registered steamers.....	2,144	87,260	94,627

NOTE.—The above includes both arrivals and departures. In addition, there are approximately 25 launches in the trade and 50 or more tourist yachts.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.	Rate per ton-mile.
				Miles.	Cents.
Fish.....	3,950 barrels.....	395	\$31,600	10	.....
Ice.....	998 tons.....	998	7,994	10	.....
Miscellaneous merchandise.....	1,710 tons.....	1,710	119,700	68	6.6
Refined oil.....	4,831 barrels.....	110	7,150	10	.....
Total.....		3,208	166,444		

Number of regular steamers in the trade, 7.

Estimated percentage of total trade carried by water, 5 per cent.

Effect of improvement on freight rates, none.

Transportation lines established during 1915: Two, one line from Gulfport to Pass a Grille and one line from Tampa to Pass a Grille.

Transportation lines abandoned during 1915: One line from Tampa to Clearwater.

23. ANCLOTE RIVER, FLA.

Maintenance dredging being needed, the dredge *Sarasota* worked on this improvement from September 11 to December 24, 1915. A total of 35,915 cubic yards of material was removed, at a field cost of \$3,763.93, or 10.48 cents per cubic yard. The channel below Sponge Harbor, about 2 miles above the entrance, was restored to a width of 75 feet and to a depth of 6½ feet, and above Sponge Harbor to the turning basin at Tarpon Springs, about 4 miles above the entrance, to a width of from 75 to 100 feet and to a depth of 5 feet. Rock was encountered in the entrance section, which prevented project depth being obtained for the full width of 100 feet over a length of about 800 feet of the outer cut. Depths of from 5 feet to 5.7 feet were attained over the rock.

APPROPRIATIONS.

Mar. 3, 1899.....	\$5,000
June 13, 1902 (allotted).....	10,000
Mar. 3, 1905 (allotted).....	5,000
Mar. 2, 1907 (allotted).....	17,000
Mar. 3, 1909 (allotted).....	5,000
June 25, 1910.....	14,500
Mar. 4, 1915 (allotted).....	5,000
July 27, 1916.....	3,000
Total of appropriations.....	64,500
Receipts from sales.....	225
Total	64,725

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.
AMERICAN.		
Registered:		
Steamers.....	20	400
Sailing.....	1,000	31,800
Unregistered:		
Steamers.....	102	1,450
Sailing.....	2,020	7,550
Lighters.....	110	1,300
Rafts.....	104	7,000
Total.....	2,446	49,500

NOTE.—The above includes both arrivals and departures. In addition, there are about 200 launches and yachts on the river in tourist season.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Rate per ton-mile.
				Cents.
Fertilizer.....	200 sacks.....	20	\$800	
Fish.....	1,600 barrels.....	180	13,400	
General merchandise.....	865 tons.....	865	216,250	
Ice.....	405 tons.....	405	2,630	
Logs, pine.....	2,070,000 feet b. m.....	7,000	20,000	
Lumber, pine.....	1,000,000 feet b. m.....	2,000	18,000	
Ship chandlery.....	320 tons.....	320	64,000	2.
Sponges.....	219,076 strings.....	220	667,225	
Wood, fuel.....	100 cords.....	170	1,020	
Total.....		11,269	990,729	

Average distance carried: Local.

No regular line of steamers in trade.

Estimated percentage of total trade carried by water, 5 per cent.

Effect of improvement on freight rates, none.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

24. CRYSTAL RIVER, FLA.

No work was done and no expenditure was made on this improvement during the year.

APPROPRIATIONS.

June 13, 1902 (allotted).....	\$10,000
Mar. 3, 1905 (allotted).....	15,000
Mar. 3, 1909 (allotted).....	8,000
June 25, 1910.....	2,000
July 25, 1912.....	2,000
Mar. 4, 1913.....	2,000
July 27, 1916.....	5,000
Total of appropriations.....	89,000
Receipts from sales.....	225
Total.....	89,225

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Unregistered:			
Steamers.....	1,000	2,796	950
Rafts.....	11	650	
Total.....	1,011	3,446	950

NOTE.—The above includes both arrivals and departures. In addition, there are approximately 70 launches on the river.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.
Fish.....	6,410 barrels.....	641	\$51,120	<i>2 1/2</i> m. 20
Groceries.....	20 tons.....	20	5,000	30
Ice.....	220 tons.....	220	1,760	20
Lugs:				
Cedar.....	100,000 feet b. m.....	400	15,200	50
Pine.....	75,000 feet b. m.....	250	1,000	(?)
Oysters.....	6,100 barrels.....	610	7,350	10
Total.....		2,141	81,430	

¹ Local.

Number of steamers in the trade, 9 small launches.

Estimated percentage of total trade carried by water, 5 per cent.

Effect of improvement on freight rates, none.

Transportation lines established during 1915: One, to islands.

Transportation lines abandoned during 1915: One, to Port Inglis.

25. WITHLACOOCHEE RIVER, FLA.

No work was done on this improvement during the year. The expenditure made was for incidentals and outstanding liabilities.

APPROPRIATIONS.

Mar. 3, 1881.....	\$7,500.00	Mar. 4, 1909 (sundry civil act).....	\$50,000.00
July 5, 1884.....	3,000.00	June 25, 1910.....	6,000.00
Aug. 5, 1886.....	3,000.00	July 25, 1912.....	38,000.00
Aug. 11, 1888.....	5,000.00	Mar. 4, 1913.....	5,000.00
Sept. 19, 1890.....	5,400.00	Mar. 4, 1913 (allotment).....	1,169.54
Aug. 18, 1894.....	800.00	Oct. 2, 1914 (allotted).....	10,000.00
June 13, 1902.....	15,000.00		
June 13, 1902.....	5,000.00		
Mar. 3, 1905.....	15,000.00	Total of appropriations.....	\$35,269.54
Mar. 2, 1907.....	65,400.00		
May 27, 1906 (sundry civil act).....	100,000.00		

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Foreign.	American.	Total.	Net registered tonnage.
Registered:				
Steamers.....	4		4	10,272
Sailing.....	2		2	1,082
Barges.....		40	40	10,000
Unregistered:				
Steamers.....		1,200	1,200	4,890
Lighters.....		600	600	12,000
Rafts.....		50	50	3,750
Total.....	6	1,890	1,896	41,914

NOTE.—The above includes both arrivals and departures. The foreign tonnage comes to the anchorage 4 miles in the Gulf of Mexico. Freight is transferred in barges plying between Inglis and the anchorage, a distance of 13 miles. The small lighter tonnage was on the extreme upper river near Istachatta. In addition there are about 40 under tonnage launches on the river.

¹ Allotment of \$5,000 from emergency appropriation, \$3,830.46 of which was returned to the Treasury.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Cross-ties.....	50,000.....	3,500	\$30,000
Fertilizer.....	1,200 bags.....	120	4,200
Iron pyrites.....	4,088 tons.....	4,088	20,184
Logs:			
Hardwood.....	375,000 feet b. m.....	750	2,625
Cypress.....	1,500,000 feet b. m.....	3,000	22,500
Lumber, pine.....	25,000 feet b. m.....	50	375
Oranges.....	40,000 boxes.....	1,000	30,000
Phosphate, hard rock.....	4,166 tons.....	4,166	37,200
Shingles.....	11,000,000 shingles.....	2,100	33,000
Wood, fuel.....	60 loads.....	1,017	6,102
Total.....		20,739	195,195

Divided as follows: Export and import, 8,252 tons; local on upper river 12,537 tons.

Number of regular steamers in trade, 1, launch (mail boat).

Estimated percentage of total trade carried by water, 60 per cent.

Transportation lines established during 1915, none.

Transportation lines abandoned during 1915, none.

26. SUWANNEE RIVER, FLA.

No work was done and no expenditure was made on this improvement during the year.

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 561)..... \$15,000.00

Present project:

June 14, 1880.....	\$5,000.00
Mar. 3, 1881.....	3,000.00
Aug. 2, 1882.....	5,000.00
July 5, 1884.....	5,000.00
Aug. 5, 1886.....	5,000.00
Aug. 11, 1888.....	15,000.00 ¹
Sept. 19, 1890.....	3,000.00
July 13, 1892.....	3,000.00
Aug. 18, 1894.....	3,000.00
June 3, 1896.....	3,000.00
Mar. 3, 1899.....	5,000.00
June 13, 1902 (allotted).....	7,658.00
Mar. 3, 1905 (allotted).....	5,000.00
Mar. 2, 1907 (allotted).....	8,000.00
	75,658.00

Total of appropriations.....	90,658.00
Carried to surplus fund of Treasury.....	4,845.98

Net total.....	85,812.02
Rent of dredge.....	78.90

Grand total.....	85,890.92
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¹ Of this appropriation \$10,000 was specifically authorized for, and was expended, in the construction of a steam snag boat with dredging and pile-driving machinery to be used on the rivers of the west coast of Florida.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.
Registered steamers.....	52	5,928
Unregistered:		
Steamers.....	125	2,000
Rafts.....	69	5,000
Total.....	246	12,928

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average distance carried.
				Miles.
Cedar sawdust.....	21 tons.....	21	\$243.00	20
Barrels (empty).....	2,397 barrels.....	86.85	6,132.00	140
Gasoline and light oils.....	168 barrels.....	34.32	2,352.00	80
Grain.....	2,109 sacks.....	137.08	4,927.65	140
Groceries.....	21 tons.....	21	6,080.00	140
Hay.....	1,530 bales.....	92.7	5,008.00	140
Logs, cypress.....	2,000,000 feet b. m.....	5,000	20,000.00	80
Lumber, pine.....	32,000 feet b. m.....	104	868.00	140
Miscellaneous.....	1,558.3 tons.....	1,368.3	19,687.27	140
Naval stores:				
Turpentine.....	844 barrels.....	182.2	21,100.00	140
Rosin.....	5,590 barrels.....	1,472.5	35,340.00	140
Rosin, drip and scrape.....	1,121 barrels.....	75.1	8,328.00	40
Total.....		7,085	129,526.92	.....

Number of regular steamers in the trade, 3.

Estimated percentage of total trade carried by water, 50 per cent.

Effect of the improvement on freight rates, none.

Transportation lines established during 1915, one.

Transportation lines abandoned during 1915, none.

27. REMOVING THE WATER HYACINTH FROM THE NAVIGABLE WATERS IN THE STATE OF FLORIDA.

The construction of a new hyacinth elevator for use on Withlacoochee River began December 29, 1915, and was completed April 15, 1916. The total cost of the elevator, including the preparation of plans and inspection and incidental office expenses, was \$3,799.65. Work of piling hyacinth with the elevator began April 17, 1916, at a point about 22½ miles above the mouth of the river and continued until May 6, 1916, when work was suspended. The field cost was \$308.76. During this period 36 acres of hyacinth were gathered and piled, and the channel was cleared for a distance of about 1½ miles below the point where work began. This work was suspended pending decision as to whether payment should be made for work done prior to the current fiscal year by Mr. J. W. Benefield under an informal agreement dated May 23, 1913.

The work of removing hyacinth from Haw Creek, a tributary of Lake Crescent, Fla., began with the U. S. power boat *Captain Maguire* April 9, 1916. An effort was made to force the hyacinth jams downstream, but owing to unfavorable winds and currents slight progress was made. A wooden grapple was devised on the boat with which the hyacinth were hoisted and piled on the banks of the stream. This method proved very satisfactory. When work ceased June 9, 1916, 22 acres of the hyacinth had been broken loose from jams and forced downstream and 145½ acres had been piled on the banks in the vicinity of Williams Landing, about 2½ miles above the mouth and between there and the mouth, satisfactorily clearing the stream for the purposes of navigation. The field cost of this work was \$1,789.37.

APPROPRIATIONS.

Mar. 8, 1899.....	\$36,000.00
June 18, 1902 (allotted).....	25,000.00
Apr. 28, 1904 (allotted).....	25,000.00
Mar. 8, 1905 (allotted).....	25,000.00
Mar. 2, 1907 (allotted).....	15,000.00
June 25, 1910 (allotted).....	5,000.00
Feb. 27, 1911 (allotted).....	10,000.00
Oct. 2, 1914 (allotted).....	5,000.00
Mar. 4, 1915 (allotted).....	5,000.00
July 27, 1916.....	10,000.00
Total of appropriations	161,000.00
Receipts from sales.....	105.50
Rent of steamer <i>Captain Maguire</i>.....	811.30
Total	161,416.80

IMPROVEMENT OF RIVERS AND HARBORS IN THE MONTGOMERY, ALA., DISTRICT.

REPORT OF CAPT. C. L. STURDEVANT, CORPS OF ENGINEERS.

IMPROVEMENTS.

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1. Carrabelle Bar and Harbor, Fla.	2331	9. Choctawhatchee River, Fla.	
2. Apalachicola Bay, Fla.	2333	and Ala.	2351
3. Apalachicola River, Fla., including the cut-off, Lee Slough, lower Chipola River, and the upper Chipola River from Marianna to its mouth..	2336	10. Holmes River, Fla., from Vernon to its mouth.....	2354
4. Entrance to St. Josephs Bay, Fla.	2340	11. The narrows in Santa Rosa Sound, Fla.	2356
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6. Chattahoochee River, Ga. and Ala.	2345	13. Harbor at Pensacola, Fla.	2359
7. Channel from Apalachicola River to St. Andrews Bay, Fla.	2348	14. Escambia and Conecuh Rivers, Fla. and Ala.	2363
8. St. Andrews Bay, Fla.	2349	15. Alabama River, Ala.	2364
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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 747 TO 801.

1. CARRABELLE BAR AND HARBOR, FLA.

The U. S. pipe-line dredge *Blackwater*, using hired labor, continued work on this improvement until July 31, 1915, removing during that time 80,132 cubic yards of material from a cut 8,366 feet long by 100 feet wide from the bar at the mouth of Carrabelle River between the wharf of the Franklin County Lumber Co.'s mill and the 10-foot contour of the inner harbor. Unit cost per cubic yard, \$0.08+.

The U. S. suction dredge *Caucus*, operated by hired labor, worked at East Pass over a total length of channel 4,145 yards, removing 109,447 cubic yards of material therefrom. Unit cost per cubic yard, \$0.089.

The result of this work was the regaining of the project dimensions throughout.

The money expended is detailed as follows:

Outstanding liabilities of the previous year.....	\$3,405.20
Dredging.....	\$16,820.89
Repairs to plant.....	851.71
Office expenses and contingencies.....	262.01
Cost of work.....	17,434.61
Outstanding liabilities.....	787.51
	16,647.10
Actual expenses during the year.....	20,052.80
59091*— was 1216—147	2331

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 421)----- \$21,704.08
 Present project:

June 13, 1902-----	\$20,000.00
June 13, 1902 (allotment June 25, 1904)-----	7,500.00
Apr. 28, 1904 (allotment Nov. 14, 1904)-----	5,000.00
Mar. 3, 1905-----	15,000.00
Mar. 2, 1907-----	60,000.00
Mar. 2, 1907 (allotment Jan. 28, 1909)-----	19,861.35
Mar. 3, 1909 (allotment Mar. 16, 1909)-----	15,000.00
Mar. 3, 1909 (allotment May 31, 1910)-----	15,000.00
June 25, 1910-----	25,000.00
Mar. 4, 1915 (allotment Apr. 2, 1915)-----	20,000.00
	<hr/> 192,361.35

Total-----	214,065.43
Carried to surplus fund (1914) from act of Mar. 3, 1909-----	15,000.00
Net total-----	<hr/> 199,065.43

COMMERCIAL STATISTICS.

Freight traffic, calendar year 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
EXPORTS.					
FOREIGN.					
Lumber, pine.....	1,569,921 feet.....	3,141	\$31,400	Miles. 6	(?)
COASTWISE.					
Feed.....	740 sacks.....	37	1,850	6	\$0.02
Lumber, pine.....	159,582 feet.....	319	3,192	6	(*)
Manufactured iron and steel.....	146 packages.....	7	280	6	.08
Miscellaneous merchandise.....	23,615 packages.....	2,361	330,540	6	.055
Oil.....	550 gallons.....	2	110	6	.0389
Resin.....	5,307 barrels.....	1,327	42,466	6	.011
Turpentine.....	1,257 barrels.....	283	31,425	6	.011
Total.....		4,336	409,853		
IMPORTS.					
COASTWISE.					
Brick.....	1,500.....	4	105	6	.02
Cement.....	2,112 sacks.....	105	1,056	6	.01
Coal.....	3 tons.....	3	15	6	.0225
Cotton seed.....	3,000 sacks.....	153	6,120	6	.015
Cottonseed meal.....	105 sacks.....	5	262	6	.0171
Fertilizer.....	209 sacks.....	21	420	6	.023
Fruit.....	967 crates.....	48	2,418	6	.045
Grain.....	15,987 sacks.....	1,199	39,988	6	.023
Hay and feed.....	1,670 bales.....	84	1,670	6	.02
Logs, cypress.....	663,341 feet.....	1,040	17,325	6	(*)
Logs, pine.....	594,170 feet.....	1,188	5,941	6	(*)
Live stock.....	2 head.....	1	300	6	.0625
Manufactured iron and steel.....	2,872 packages.....	144	5,760	6	.06
Miscellaneous merchandise.....	28,077 packages.....	2,807	392,980	6	.062
Oil.....	2,060 gallons.....	10	412	6	.0389
Resin.....	1,100 barrels.....	275	8,800	6	.011
Salt.....	1,780 sacks.....	178	1,780	6	.018

¹Allotment of \$10,000, of which \$188.65 was returned to Treasury to credit of appropriation.

²Cargo.

³Barged.

⁴Rafted.

Freight traffic, calendar year 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-miles.
IMPORTS—Continued.					
COASTWISE—continued.					
Sugar.....	134 barrels.....	26	\$4,180	Miles. 6	\$0.025
Turpentine.....	370 barrels.....	83	9,360	6	.011
Total.....		7,374	498,762		
RECAPITULATION.					
Total exports:					
Foreign.....		3,141	31,400		
Coastwise.....		4,336	409,853		
Total imports, coastwise.....		7,374	498,762		
Total.....		14,851	940,015		
Decrease from last year.....		20,629	232,945		

There are no imports from foreign ports into this harbor.

Decrease from last year's report caused by the inability to obtain bottoms for the export lumber and timber trade. This decrease is, in all probability, a temporary one.

In addition to the above traffic, the exports and imports of Apalachicola Bay, Fla., amounting to 16,171 tons and valued at \$977,568, must necessarily pass over a part of this improvement, which should receive credit for same.

Statement of vessels for the port of Carrabelle, Fla., for the calendar year ending Dec. 31, 1915.

Sailing:		
American.....		2
Foreign.....		5
Total.....		7
Net registered tonnage.....		3,844

In addition to the above the following vessels are regularly engaged in the business of the port:

Class.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	2	381	6,119
Gasoline launches.....	1	33	
Tugs.....	4	123	
Unregistered:			
Barges.....	14	1,400	
Rafts.....	67		
Total.....	88	1,937	

Number of ton-miles of freight transported:

Exports—		
Foreign.....		18,846
Coastwise.....		26,016
Imports, coastwise.....		44,244
Total.....		89,106
Expenditures for the year on this improvement.....		\$18,423.78
Expenditure per ton-mile of freight transported.....		\$0.20876

2. APALACHICOLA BAY, FLA.

The work of extending the pile and brush bulkhead at the river bar toward the city of Apalachicola was commenced in February, 1916, and was carried on until March 31. Three thousand and seventeen

linear feet of bulkhead were constructed. Work of repairing the old bulkhead was commenced on April 1 and completed for a distance of 2,188½ linear feet at the close of the month of April, when, owing to insufficient funds, work was suspended. A survey of the bar to the east of the bulkhead shoal was made. Fourteen obstructions were removed from the channel in the bay and the necessary repairs made to plant.

The cost was as follows:

Extension of bulkhead 3,017 linear feet.....	\$12,741.90
Repairs to 2,188½ linear feet bulkhead.....	8,610.15
Survey of bar to the east of bulkhead shoal.....	2,933.90
Removal of 14 obstructions from channel and Apalachicola Bay.....	21.30
Repairs to plant.....	141.45
Superintendence and contingencies.....	2,263.11
Cost of work.....	26,711.81

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess, p. 397)--- \$303,850.29
Present project:

Mar. 2, 1907.....	\$85,000.00	
Mar. 2, 1907 (allotment Oct. 25, 1912).....	10,000.00	
Mar. 3, 1909 (allotment Mar. 24, 1909).....	20,000.00	
June 25, 1910.....	22,500.00	
Feb. 27, 1911.....	5,000.00	
Mar. 4, 1913.....	20,000.00	
Oct. 2, 1914 (allotment Oct. 7, 1914).....	15,000.00	
Mar. 4, 1915 (allotment Apr. 2, 1915).....	25,000.00	
July 27, 1916.....	10,000.00	
		212,500.00
Total.....		516,350.29

COMMERCIAL STATISTICS.

Freight traffic, calendar year 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
EXPORTS.					
FOREIGN.					
Lumber, pine.....	235,000 feet.....	470	\$4,700	<i>Miles.</i> 30	(1)
Timber, pine.....	1,070,815 feet.....	2,140	21,400	30	(1)
Total.....		2,610	26,100		
COASTWISE.					
Fruit.....	60 crates.....	3	125	30	\$0.0375
Grain.....	20 sacks.....	2	50	30	.0136
Logs, pine.....	54,260 feet.....	108	798	30	(2)
Lumber:					
Cypress.....	3,741,877 feet.....	5,613	128,704	30	(2)
Pine.....	8,323 feet.....	17	167	30	.023
Manufactured iron and steel.....	295 packages.....	15	600	30	.055
Miscellaneous merchandise.....	12,584 packages.....	1,258	176,125	30	.062
Resin.....	12,833 barrels.....	3,208	102,793	30	.01
Shingles.....	70,000.....	12	250	30	.0111
Turpentine.....	3,050 barrels.....	610	76,250	30	.01
Wool.....	32 bales.....	6	1,290	30	.064
Total.....		10,853	487,172		

¹Barged.

²Rafted.

³Cargo.

Freight traffic, calendar year 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
IMPORTS.					
COASTWISE.					
Brick.....	3,700	10	\$36	30	\$0.01
Cement.....	1,400 sacks	70	700	30 .....	.02
Coal.....	12 tons	12	60	30 .....	.0175
Cotton seed.....	1,538 sacks	77	3,076	30 .....	.023
Cottonseed meal.....	230 sacks	11	575	30 .....	.0136
Feed.....	740 sacks	37	1,860	30 .....	.02
Fertilizer.....	270 sacks	27	540	30 .....	.0203
Fruit.....	2,937 crates	147	7,343	30 .....	.0337
Grain.....	21,157 sacks	1,577	52,368	30 .....	.023
Hay.....	3,377 bales	169	8,377	30 .....	.0215
Live stock.....	2 head	1	300	30 .....	.0625
Logs:					
Cypress.....	558,185 feet	852	7,820	30	()
Pine.....	67,238 feet	134	750	30	()
Manufactured iron and steel.....	8,248 packages	412	16,480	30 .....	.055
Miscellaneous merchandise.....	56,040 packages	5,004	840,000	30 .....	.0512
Oil.....	25,140 gallons	113	5,533	30 .....	.025
Salt.....	1,951 sacks	195	1,951	30 .....	.0175
Sugar.....	159 barrels	37	5,597	30 .....	.0366
Total.....		9,485	949,676		
RECAPITULATION.					
Total exports:					
Foreign.....		2,610	26,100		
Coastwise.....		10,852	487,172		
Total imports, coastwise.....		9,485	949,676		
Total.....		22,947	1,462,948		
Decrease from last year.....		6,828	286,874		

¹ Rafted.

There are no imports from foreign ports into this harbor.

Decrease from last year's report caused by the inability to obtain bottoms for the export lumber and timber trade. This decrease is, in all probability, a temporary one.

Statement of vessels for the port of Apalachicola, Fla., for the calendar year ending Dec. 31, 1915.

Sailing:
 American..... 6
 Net registered tonnage..... 3,873

In addition to the above the following vessels are regularly engaged in the business of the port:

Class.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	3	361	6,119
Gasoline launches.....	1	33	
Tugs.....	4	123	
Unregistered:			
Barges.....	14	1,400	
Rafts.....	34		
Total.....	55	1,937	6,119

Number of ton-miles of freight transported:

Exports—
 Foreign..... 73,300
 Coastwise..... 326,560
Imports—
 Coastwise..... 284,580
Total..... 684,440
 Expenditures for the year on this improvement..... \$14,750.43
 Expenditure per ton-mile of freight transported..... \$0.0214

3. APALACHICOLA RIVER, FLA., INCLUDING THE CUT-OFF, LEE SLOUGH, LOWER CHIPOLA RIVER AND UPPER CHIPOLA RIVER FROM MARIANNA TO ITS MOUTH.

Apalachicola River.—The U. S. dredge *Blackwater* removed 67,021 cubic yards of sand and gravel in a cut 3,995 feet long from the bar at Chattahoochee, Fla. The field cost of this work was \$2,108.91, or a unit cost of 3 cents per cubic yard. Detailed expenditures, all for maintenance, were as follows:

Dredging operations.....	\$2,108.91
Towing plant.....	2,163.43
Repairs to plant.....	208.86
Care of plant.....	3,733.72
Office expenses and contingencies.....	1,718.24
Cost of work.....	9,933.16
Outstanding liabilities.....	2,774.07
Actual expenditures during fiscal year.....	7,159.09

Cut-off, Lee Slough, and lower Chipola River.—The U. S. dredge *Albany*, operated by hired labor accomplished the following work for straightening the channel:

Location.	Cubic yards removed.	Length of cut.	Character of material.	Unit cost.	Total for location.
Apalachee Point.....	9,547	<i>Feet.</i> 673	Mud, etc...	\$0.23	\$2,144.87
Red Bull Bluff.....	11,839	403	.....do.....	.13	1,751.00
Total.....					3,895.87

The snag boat *Chattahoochee* did the following work of snagging:

	Field cost.
At Apalachee Point.....	\$931.26
From right of way:	
Trees cut.....	265
Stumps blasted.....	272
At Red Bull Bluff.....	1,225.25
From right of way:	
Trees cut.....	795
Snags.....	56
Logs.....	161
From banks:	
Trees.....	848
At Cochran's Landing.....	1,395.36
From channel:	
Snags.....	13
From banks:	
Overhanging trees.....	254
Total.....	3,551.87

Detailed expenditures were as follows:

Dredging operations.....	\$3,895.87
Snagging operations.....	3,551.87
Towing plant.....	1,174.37
Repairs to plant.....	1,458.99
Care of plant.....	652.38
Office expenses and contingencies.....	1,863.24
Cost of work.....	12,596.72
Outstanding liabilities.....	276.47
Actual expenditures during fiscal year.....	12,320.25

Upper Chipola River from Marianna to its mouth.—The U. S. dredge *Upatoi*, operated by hired labor, removed 29,450 cubic yards of mud from a channel 4,335 feet long in the Dead Lakes at a field cost of \$1,989.35, or a unit cost of 6.7 cents per cubic yard. The U. S. snag boat *Flint*, operated by hired labor, removed 135 overhanging trees from the banks and 379 snags and stumps from the channel in the Dead Lakes at a field cost of \$1,137.29. Detailed expenses were as follows:

Outstanding liabilities from the previous year		\$3,237.81
Dredging operations	\$1,989.35	
Snagging operations	1,137.29	
Repairs to dredge <i>Upatoi</i>	692.72	
Office expenses and contingencies	135.00	

Cost of work	8,954.86
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Actual expenditures during the fiscal year	7,192.17
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Summary of money expended.

Outstanding liabilities from previous year		3,237.81
Cost of work:		
Apalachicola River	9,933.16	
Cut-off, Lee Slough and lower Chipola River	12,596.72	
Upper Chipola River	3,954.86	
Total cost of work	26,484.24	
Outstanding liabilities	3,050.54	
		23,433.70
Actual expenditures during the fiscal year		26,671.51

APPROPRIATIONS.

Apalachicola River, including the cut-off, Lee Slough, lower Chipola River, and upper Chipola River from Marianna to its mouth.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 397).....¹ \$13,000.00

Present project:

June 23, 1874	\$10,000.00
Mar. 3, 1875	10,000.00
June 18, 1878	8,000.00
Mar. 3, 1879	5,000.00
June 14, 1880	2,000.00
Mar. 3, 1881	1,500.00
Aug. 2, 1882	2,000.00
July 5, 1884	1,000.00
Aug. 5, 1886	1,000.00
Aug. 11, 1888	2,000.00
Sept. 19, 1890	2,000.00
July 13, 1892	5,000.00
Aug. 13, 1894	5,000.00
June 3, 1896	5,000.00
Mar. 3, 1899	5,000.00
Mar. 3, 1899	3,000.00
June 6, 1900 (allotment July 19, 1900)	1,500.00
June 13, 1902	6,000.00
June 13, 1902 (allotment May 31, 1904)	3,750.00
June 13, 1902	2,000.00
Mar. 3, 1905	8,000.00
Mar. 3, 1905 (allotment Mar. 31, 1905)	4,000.00
Mar. 3, 1905 (allotment Nov. 15, 1905)	5,000.00

¹ For Chipola River, by act of Feb. 24, 1835, \$5,000; by act of July 2, 1836, \$4,000; total, \$9,000. Not included in total of \$13,000. (H. Doc. 1491, 63d Cong., 3d sess., p. 426.)

² Exclusive of upper Chipola River.

³ For upper Chipola River only.

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Present project—Continued.

Mar. 2, 1907	\$18,000.00
Mar. 2, 1907 (allotment Mar. 27, 1907)	9,000.00
Mar. 8, 1909 (allotment Mar. 16, 1909)	18,000.00
June 25, 1910	6,500.00
Feb. 27, 1911	5,000.00
July 25, 1912	12,000.00
Mar. 4, 1913	7,000.00
Mar. 4, 1913 (allotment June 17, 1914)	2,000.00
Oct. 2, 1914 (allotment Oct. 7, 1914)	15,000.00
Mar. 4, 1915 (allotment Apr. 2, 1915)	30,000.00
July 27, 1916	6,000.00
Total	\$219,250.00
	232,250.00

COMMERCIAL STATISTICS.

[For calendar year 1915.]

APALACHICOLA RIVER, CUT-OFF, LEE SLOUGH, AND LOWER CHIPOLA RIVER.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers	6	881	10,678
Tugs	3	67	.....
Unregistered:			
Barges	4	400	.....
Rafts	152	.....	.....
Total	165	1,348	10,678

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
UPSTREAM.					
Brick	8,150	23	357	Miles. 60	\$0.04
Cement	526 sacks	26	263	60	.04
Cotton	4,201 bales	1,060	262,060	30	.01
Cotton seed	1,980 sacks	99	3,960	40	.0287
Fertilizer	1,222 sacks	122	2,440	60	.01
Fruit	15,625 crates	796	39,812	65	.0275
Grain	37,637 sacks	2,823	94,063	70	.0225
Hay and feed	8,920 bales	446	8,920	60	.0257
Live stock	28 head	14	2,800	65	.05
Lumber, pine	626,000 feet	1,262	12,520	75	.0275
Manufactured iron and steel	2,347 packages	113	4,520	70	.03
Miscellaneous merchandise	208,075 packages	20,806	2,913,120	80	.04
Oil	34,110 gallons	136	6,822	65	.0225
Resin	46,247 barrels	11,562	360,976	70	.015
Salt	485 sacks	48	485	80	.025
Sand and gravel	245 barrels	61	720	100	.005
Shingles	1,292,700	216	5,170	85	.0235
Sugar, honey, and sirup	1,577 barrels	315	49,202	60	.03
Ties, cross	1,640	147	820	60	.02
Turpentine	11,587 barrels	2,317	289,675	70	.015
Wool and hides	2,121 bales	39	4,040	70	.025
Total		42,413	4,061,485		

¹ Exclusive of upper Chipola River.

Freight traffic—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
DOWNSTREAM.					
Brick.....	87,412.....	250	\$809	Miles. 70	\$0.02
Cement.....	3,025 sacks.....	151	1,513	70	.0275
Coal.....	76 tons.....	76	380	73	.0287
Cotton.....	14 bales.....	4	840	28	.04
Cotton seed.....	450 sacks.....	23	900	28	.08
Fertilizer.....	56,875 sacks.....	5,087	113,750	60	.02
Fruit.....	2,065 crates.....	108	5,108	60	.0837
Grain.....	31,200 sacks.....	2,347	78,225	70	.085
Hay and feed.....	2,245 bales.....	112	2,245	60	.085
Live stock.....	73 head.....	36	7,300	60	.0375
Logs:					
Ash.....	1,147,737 feet.....	2,295	22,955	48	(¹)
Cottonwood.....	1,076,826 feet.....	1,615	10,768	70	(¹)
Cypress.....	7,048,556 feet.....	10,572	140,970	60	(¹)
Pine.....	1,262,300 feet.....	2,524	25,245	90	(¹)
Poplar.....	184,797 feet.....	369	3,727	90	(¹)
Miscellaneous.....	83,056 feet.....	166	1,660	60	(¹)
Lumber.....	26,780 feet.....	53	535	75	.0175
Manufactured iron and steel.....	8,000 packages.....	408	16,120	62	.025
Miscellaneous merchandise.....	219,899 packages.....	21,970	3,075,800	67	.025
Oil.....	14,112 gallons.....	56	2,822	67	.035
Resin.....	7,522 barrels.....	1,880	60,176	67	.025
Salt.....	1,325 sacks.....	123	1,325	70	.0325
Shingles.....	114,000.....	19	456	55	.025
Stone.....	11 tons.....	11	550	80	.01
Sugar, honey, and sirup.....	1,838 barrels.....	368	50,245	70	.02125
Ties, cross.....	3,240.....	291	1,620	65	.025
Turpentine.....	4,534 barrels.....	907	113,375	67	.025
Wool.....	40 bales.....	8	1,675	65	.04
Total.....		52,418	3,741,050		
RECAPITULATION.					
Freight traffic:					
Upstream.....		42,413	4,061,485		
Downstream.....		52,418	3,741,050		
Total commerce.....		94,831	7,802,535		
Decrease from last year.....		27,266	5,152,005		

¹ Rafted.

The decrease from last year's report was due to the unsettled condition of the lumber, timber, and naval-stores market. This decrease is, in all probability, a temporary one. The large decrease in valuation was due to the excessive valuation of miscellaneous merchandise reported by the steamboat people for the year 1914.

Number of ton-miles of freight transported:

Upstream.....	3,128,310
Downstream.....	3,429,896
Total.....	6,558,206
Expenditure for the year on this improvement.....	\$7,477.04
Expenditure per ton-mile of freight transported.....	0.0011

UPPER CHIPOLA RIVER.

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Registered steamers.....	1	50	485
Unregistered rafts.....	76		
Total.....	77	50	485

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was hauled.	Rate per ton-mile.
UPSTREAM.					
Brick.....	6,500.....	19	\$46	Miles. 30	\$0.04
Cement.....	220 sacks.....	11	110	35	.04
Fertilizer.....	1,095 sacks.....	110	2,300	35	.04
Grain.....	10,785 sacks.....	809	26,963	35	.04
Hay and feed.....	6,270 bales.....	314	6,270	35	.08
Lumber.....	36,650 feet.....	73	732	30	.08
Manufactured iron and steel.....	1,070 packages.....	54	2,160	35	.04
Miscellaneous merchandise.....	17,560 packages.....	1,756	175,600	35	.04
Oil.....	3,260 gallons.....	13	652	40	.08
Salt.....	195 sacks.....	19	195	35	.08
Shingles.....	112,900.....	24	572	35	.04
Sugar.....	190 barrels.....	37	5,928	35	.04
Total.....		3,239	221,429		
DOWNSTREAM.					
Cotton.....	14 bales.....	4	840	35	.04
Cotton seed.....	450 sacks.....	23	900	30	.08
Fruit.....	275 crates.....	13	688	35	.04
Live stock.....	25 head.....	3	275	35	.08
Logs:					
Ash.....	23,157 feet.....	46	460	35	(1)
Cottonwood.....	38,825 feet.....	59	388	35	(1)
Cypress.....	3,127,000 feet.....	4,691	62,540	20	(1)
Pine.....	179,667 feet.....	359	1,797	30	(1)
Lumber.....	4,380 feet.....	9	88	25	.04
Miscellaneous merchandise.....	1,512 packages.....	151	21,040	35	.04
Resin.....	4,360 barrels.....	1,090	34,890	45	.04
Ties, cross.....	840.....	75	420	25	.08
Turpentine.....	3,260 barrels.....	652	81,600	40	.04
Wool.....	35 bales.....	5	1,450	35	.04
Total.....		7,180	207,266		
RECAPITULATION.					
Freight traffic:					
Upstream.....		3,239	221,429		
Downstream.....		7,180	207,266		
Total.....		10,419	428,695		
Increase over last year.....		3,082	76,490		

¹ Rafted.

Number of ton-miles of freight transported:

Upstream.....	112,970
Downstream.....	192,345
Total.....	305,315
Expenditures for the year on this improvement.....	\$16,791.70
Expenditure per ton-mile of freight transported.....	\$0.055

4. ENTRANCE TO ST. JOSEPHS BAY, FLA.

There were no active operations during the fiscal year. The money expended was as follows:

Office expenses.....	\$76.40
Actual expenditures during the fiscal year.....	76.40

No further operations are contemplated for the next fiscal year, except a small local survey, as it is thought that the project depth and width will be maintained by natural causes.

APPROPRIATIONS.

Present project:	
July 25, 1912.....	\$20,000
Mar. 4, 1913.....	10,000
Total.....	30,000

Present project—Continued.

Transferred under authority of act of Mar. 4, 1915.....	\$9,500
Net total.....	20,500
Contributed funds.....	20,000
Grand total.....	40,500

COMMERCIAL STATISTICS.

Freight traffic, calendar year 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
EXPORTS.					
FOREIGN.				<i>Miles.</i>	
Timber, pine.....	901,207 feet.....	1,802	\$36,750	9	(^c)
COASTWISE.					
Ties, cross.....	16,831.....	1,519	10,129	9	(^c)
IMPORTS.					
COASTWISE.					
Lumber, pine.....	68,552 feet.....	117	1,172	9	(^c)
RECAPITULATION.					
Total exports:					
Foreign.....		1,802	36,750		
Coastwise.....		1,519	10,129		
Total imports, coastwise.....		117	1,172		
Total commerce.....		3,438	48,051		
Decrease from last year.....		7,849	54,215		

¹ Cargo.

² Barged.

There are no imports from foreign ports into this harbor.

Decrease from last year's report caused by the inability to obtain bottoms for the export lumber and timber trade. This decrease is, in all probability, a temporary one.

Statement of vessels for the port of Port St. Joe, Fla., for the calendar year ending Dec. 31, 1915.

Class.	Ameri-can.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers.....		2	2	4,778
Sailing.....	2		2	1,532
Tugs.....	1		1	33
Unregistered barges.....	1		1	100
Total.....	4	2	6	6,443

Number of ton-miles of freight transported:

Exports—	
Foreign.....	16,218
Coastwise.....	13,671
Imports, coastwise.....	1,068
Total.....	30,942
Expenditures for the year on this improvement.....	\$3.84
Expenditure per ton-mile of freight transported.....	\$0.00012

5. FLINT RIVER, GA.

Work of improvement was continued, using the U. S. dredge *Albany*, assisted by drilling barge *No. 16* for a period of five months, resulting in the removal of a total of 15,598 cubic yards of rock excavation; 8,110 cubic yards being used in constructing submerged dam at the foot of Sycamore Shoals to reduce current velocity. The total field cost was \$7,162.53, or a unit cost of \$0.4592 per cubic yard, including the construction of submerged dam.

The dipper dredge *Upatoi* was transferred from another work on September 3, and at the end of the fiscal year was engaged in work of improvement at Flat Rock Shoals. During 10 months' operation the total number of cubic yards removed by the *Upatoi* was 78,660 cubic yards, classified as follows: Rock excavation, 66,867 cubic yards; marl, 10,293 cubic yards; sand and gravel, 1,500 cubic yards. The total field cost, including placing 3,526 cubic yards constructing submerged dam at foot of Maples Chute, was \$16,262.12, a unit field cost of \$0.2067 per cubic yard.

The dredge *Blackwater* removed from the mouth of the river 3,391 cubic yards of sand at a total field cost of \$642.09, a unit cost of \$0.1898 per cubic yard.

Snagging operations consisted of the removal of 134 snags, logs, and trees at a total field cost of \$267.96.

Surveys were made of Sycamore Shoals, Maples Chute, Coxs Shoals, Flat Rock Shoals, Jumping Gully, Griffins Pocket, and Du Bignon Shoals; surveys after dredging at Winding Shoals, Sycamore Shoals, Maples Chute, and Blue Spring Shoals were made and maps prepared. The total expenditure for surveys was \$1,767.08.

The dredging operations were as follows:

Location.	Miles below Albany.	Character of material.	Cubic yards.	Total cost for location.	Cost per yard.
Dredge Albany:					
Blue Spring Shoals	4.5	Rock	4,988	\$1,413.80	\$0.2832
Sycamore Shoals	51.1	do	10,610	5,748.73	.5418
Dredge Upatoi:					
Factory Reach	72.3	Sand and gravel	1,200	198.94	.1657
Buzzard Roost	63.0	do	300	121.70	.4066
Humphries Shoals	60.0	Rock	3,487	751.45	.2155
Winding Shoals	52.2	do	34,545	8,773.24	.1959
Do		Marl	10,293		
Maples Chute	50.7	Rock	3,526	1,520.93	.4313
Coxs Shoals	50.0	do	4,104	885.26	.2156
Flat Rock Shoals	54.2	do	21,205	4,010.60	.1891
Dredge Blackwater, bar at mouth of river.	102.5	Sand	3,391	642.09	.1898
Total			97,649	24,066.74	

The cost of work is detailed as follows:

Outstanding liabilities from last year	\$7,913.71
Dredging	\$24,066.74
Superintendence	2,018.02
Snagging	267.96
Surveys	1,767.08
Repairs and alterations of plant	2,265.31
Miscellaneous	3,714.49
Cost of work	34,099.60
Outstanding liabilities	2,819.17
	31,280.43
Actual expenditures for the year	39,194.14

APPROPRIATIONS.

Present project:

June 23, 1874	} ¹ \$18, 000
Mar. 3, 1875	
Aug. 14, 1876	
June 18, 1878	10, 000
Mar. 3, 1879	7, 000
June 14, 1880	20, 000
Mar. 3, 1881	15, 000
Aug. 2, 1882	25, 000
July 5, 1884	20, 000
Aug. 5, 1886	20, 000
Aug. 11, 1888	20, 000
Sept. 19, 1890	20, 000
July 18, 1892	15, 000
Aug. 18, 1894	8, 000
June 3, 1896	8, 000
Mar. 3, 1899	5, 000
June 13, 1902	25, 000
Mar. 3, 1905	20, 000
Mar. 2, 1907	25, 000
Mar. 3, 1909 (allotment Apr. 9, 1909)	25, 000
June 25, 1910	25, 000
Feb. 27, 1911	7, 500
July 25, 1912	10, 000
Mar. 4, 1913	15, 000
Oct. 2, 1914 (allotment Oct. 7, 1914)	18, 000
Mar. 4, 1915 (allotment Apr. 2, 1915)	40, 000
July 27, 1916	60, 000
Total	481, 500

COMMERCIAL STATISTICS.

[For the calendar year 1915.]

Vessel classification.

Class.	Number.	Net registered tonnage.	Passengers.
Registered steamers	4	338	3, 600
Unregistered rafts	26		
Total	30	338	3, 600

¹The sum expended on Flint River from joint appropriations for Chattahoochee and Flint Rivers amounted to \$70,000.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
UPSTREAM.					
Brick.....	41,000.....	113	\$287	<i>Miles.</i> 39	\$0.01
Cement.....	50 sacks.....	3	25	45	.035
Cotton.....	823 bales.....	206	49,380	40	.035
Cotton seed.....	11,918 sacks.....	595	23,800	30	.03725
Fertilizer.....	5,000 sacks.....	500	10,000	40	.0375
Fruit.....	775 crates.....	39	1,938	35	.0555
Grain.....	1,310 sacks.....	98	3,835	40	.035
Hay and feed.....	512 bales.....	26	512	30	.035
Live stock.....	110 head.....	30	3,300	30	.05
Lumber.....	135,000 feet.....	270	2,700	40	.025
Manufactured iron and steel.....	1,000 packages.....	50	4,700	35	.04
Miscellaneous merchandise.....	19,512 packages.....	976	136,640	35	.085
Oil.....	32,500 gallons.....	160	9,500	35	.045
Resin.....	14,160 barrels.....	3,540	127,440	36	.026
Salt.....	612 sacks.....	61	612	30	.04
Shingles.....	34,160.....	6	136	35	.04
Sugar.....	335 barrels.....	63	8,175	40	.0445
Ties, cross.....	160.....	16	80	30	.05
Turpentine.....	6,260 barrels.....	1,565	156,500	36	.026
Wool.....	8 bales.....	1	400	30	.06
Total.....		8,318	539,960		
DOWNSTREAM.					
Brick.....	94,000.....	269	658	36	.035
Cement.....	950 sacks.....	48	475	38	.035
Cotton.....	120 bales.....	30	7,200	35	.0275
Cotton seed.....	110 sacks.....	6	240	35	.03725
Fertilizer.....	16,000 sacks.....	1,600	32,000	40	.0375
Fruit.....	360 crates.....	29	900	37	.0465
Grain.....	30,770 sacks.....	2,306	76,925	36	.035
Hay and feed.....	3,330 bales.....	166	3,320	36	.035
Live stock.....	45 head.....	11	2,250	35	.04
Logs:					
Cypress.....	25,061 feet.....	37	500	20	()
Pine.....	554,003 feet.....	1,108	7,968	30	()
Poplar.....	157,508 feet.....	315	3,321	30	()
Lumber.....	124,000 feet.....	248	2,480	35	.03
Manufactured iron and steel.....	4,366 packages.....	206	23,960	38	.03
Miscellaneous merchandise.....	59,586 packages.....	5,958	834,120	38	.0555
Oil.....	9,340 gallons.....	41	2,802	38	.04
Resin.....	8,075 barrels.....	2,019	72,675	40	.025
Salt.....	1,520 sacks.....	152	1,520	36	.0357
Shingles.....	14,500.....	3	58	36	.043
Sugar.....	1,290 barrels.....	234	32,616	36	.0445
Turpentine.....	2,035 barrels.....	507	60,875	40	.025
Total.....		15,285	1,156,888		
RECAPITULATION.					
Freight traffic:					
Upstream.....		8,318	539,960		
Downstream.....		15,285	1,156,888		
Total.....		23,603	1,696,848		
Decrease from last year.....		13,934	664,265		

¹ Rafted.

The decrease from last year's report was due to the unsettled condition of the lumber, timber, and naval stores market and to the absence of facilities for water transportation between Albany and Newton during the cotton season.

Number of ton-miles of freight transported:

Upstream.....	296,757
Downstream.....	569,874
Total.....	866,631
Expenditure for the year on this improvement.....	\$31,201.47
Expenditure per ton-mile of freight transported.....	\$0.0359

6. CHATTAHOOCHEE RIVER, GA. AND ALA.

Dredging operations were carried on from the beginning of the fiscal year until November 6, 1916, except during period of high water. The results are given in the table below. The work was done by the U. S. dredges *Blackwater* and *Muscogee*, operated by hired labor.

Location.	Cubic yards removed.	Length of channel.	Character of material.	Unit cost.	Total for location.	Depth before.	Depth after.
		<i>Feet.</i>				<i>Feet.</i>	<i>Feet.</i>
Town Reach.....	16,673	913	Sand and gravel.....	\$0.21	\$3,423.43	2	8
Ball Creek.....	79,504	5,747	do.....	.04	3,189.63	34	8
Jennies Island.....	11,989	609	do.....	.18	2,132.41	34	8
Neals Landing.....	41,706	2,194	Sand, gravel, and stone..	.11	4,780.56	2-24	5-54
Total.....					13,526.03		

The snag boats *Chattahoochee* and *Flint* removed 78 snags, 8 logs, and 44 trees from the channel and 182 overhanging trees from the banks at a field cost of \$733.01. This work was conducted near Columbus, Ga., and near the mouth of the river.

Jetty work was undertaken at the location given below by the towboat *Columbus*, the snag boat *Chattahoochee*, and auxiliary plant, all operated by hired labor. Work at Kings Rock was interrupted by high water, the piling only having been driven.

Miles.	Location.	Piles driven.	Linear feet of jetty.	Yards of rock placed.	Cords of brush.	Cost per linear foot.	Total cost.
154 174 1504 154 174	Euclies Reach ¹	2,796	9,896	338	5,670	\$1.77	\$17,527.10
	Kings Rock ¹	89	178			2.21	394.31
	Euclies Reach ²	1,398	2,843		2,835	3.08	8,763.55
							\$26,684.96

¹ New work.² Repairs.

NOTE.—The jetty at Kings Rock is incomplete, the piling only having been driven; no brush placed.

The expenditures in detail were as follows:

Outstanding liabilities from the previous year.....	\$15,062.00
Dredging operations.....	\$13,526.03
Snagging operations.....	733.01
Jetty work, new.....	17,921.41
Jetty work, repairs.....	8,763.55
Towing plant.....	11,865.60
Raising barge No. 29.....	631.00
Repairs and renewals to <i>Blackwater</i>	4,595.38
Repairs and renewals to <i>Flint</i>	6,485.45
Repairs to <i>Chattahoochee</i>	3,811.91
Repairs to <i>Columbus</i>	156.63
Repairs to launch <i>Eufaula</i>	285.42
Repairs to launch <i>Chipola</i>	194.75
Repairs to launch <i>Ocot</i>	5.00
Repairs to pile drivers 4 and 5.....	63.25
Repairs to brush-gang quarter boat.....	961.53
Repairs to dredge <i>Muscogee</i>	1,483.08

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Repairs to barge No. 19	\$89.00
Repairs to barge No. 20	78.00
Repairs to barge No. 29	1,594.18
Care of plant	4,800.69
Superintendence and contingencies	2,303.54
Office expense, main office	1,080.46
Cost of work	80,878.87
Outstanding liabilities	2,116.04
	\$78,762.88
Actual expenditures during the fiscal year	98,825.43
Chargeable to new work	73,536.98
Chargeable to maintenance	20,288.50
Total	93,825.48

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 423)	\$2,000.00
Present project:	
June 23, 1874	} \$52,000.00
Mar. 3, 1875	
Aug. 14, 1876	
June 18, 1878	18,000.00
Mar. 3, 1879	15,000.00
June 14, 1880	20,000.00
Mar. 3, 1881	20,000.00
Aug. 2, 1882	25,000.00
July 5, 1884	35,000.00
Aug. 5, 1886	20,000.00
Aug. 11, 1888	20,000.00
Sept. 19, 1890	20,000.00
July 13, 1892	* 25,000.00
Aug. 18, 1894	* 30,000.00
June 3, 1896	* 25,000.00
Mar. 3, 1899	* 50,000.00
June 13, 1902	* 100,000.00
Apr. 28, 1904 (allotment May 31, 1904)	32,650.00
Mar. 3, 1905	75,000.00
Mar. 3, 1905 (allotment Nov. 15, 1906)	10,000.00
Mar. 2, 1907	150,000.00
Mar. 3, 1909 (allotment Apr. 9, 1909)	115,000.00
June 25, 1910	75,000.00
Feb. 27, 1911	75,000.00
July 25, 1912	50,000.00
Mar. 4, 1913	80,000.00
Mar. 4, 1913 (allotment Sept. 18, 1914)	* 2,503.50
Oct. 2, 1914 (allotment Oct. 7, 1914)	65,000.00
Mar. 4, 1915 (allotment Apr. 2, 1915)	75,000.00
July 27, 1916	120,000.00
	1,400,153.50
Total	1,402,153.50
Carried to surplus fund, act of Feb. 24, 1835	2,000.00
Net total	1,400,153.50

* The sum expended on Chattahoochee River from joint appropriations for Chattahoochee and Flint Rivers, amounting to \$70,000.

* Of which \$5,000 was expended between West Point and Franklin, Ga.

* Of which \$15,000 may be applied to procurement of a dredge boat to be used on the Chattahoochee, Flint, and Apalachicola Rivers, and \$5,000 of the appropriation, together with unexpended balance on hand, shall be applied to survey of the Chattahoochee River between West Point and Franklin, Ga.

* For section below Columbus, Ga. No appropriation for section between West Point and Franklin, Ga. (H. Doc. 111, 56th Cong., 2d sess.)

* Allotment of \$5,000, of which \$2,496.50 was returned to Treasury.

COMMERCIAL STATISTICS.

[For the calendar year 1915.]

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Registered steamers.....	6	747	5,227
Unregistered:			
Barges.....	2	100	
Rafts.....	7		
Total.....	15	847	5,227

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
UPSTREAM.					
Brick.....	20,000	57	\$140	Miles. 30	\$0.02
Cement.....	85 sacks	4	43	40	.005
Cotton.....	12,566 bales	3,142	753,960	125	.01
Cotton seed.....	10,725 sacks	356	21,450	65	.01
Fertilizer.....	3,000 sacks	300	6,000	65	.01
Fruit.....	1,250 crates	94	3,125	150	.01
Grain.....	4,100 sacks	308	10,250	80	.0075
Hay and feed.....	1,325 bales	66	1,325	60	.01
Hides.....	2,575 packages	48	5,750	125	.0075
Live stock.....	35 head	17	8,500	75	.02
Lumber.....	12,500 feet	25	250	110	.0075
Manufactured iron and steel.....	1,721 packages	86	8,600	80	.0075
Miscellaneous merchandise.....	197,105 packages	19,710	2,750,400	110	.015
Oil.....	2,300 gallons	9	440	45	.0075
Resin.....	3,100 barrels	775	24,800	65	.005
Salt.....	785 sacks	79	785	50	.005
Sand and gravel.....	225 barrels	24	675	120	.005
Shingles.....	475,000	80	2,375	125	.0075
Sugar, honey, and sirup.....	1,255 barrels	305	30,405	125	.01
Turpentine.....	275 barrels	55	6,900	60	.005
Total.....		25,540	3,640,173		
DOWNSTREAM.					
Brick.....	145,000	414	1,015	100	.01
Cement.....	3,122 sacks	156	1,561	120	.005
Coal.....	75 tons	75	800	150	.0075
Cotton seed.....	10,531 sacks	527	21,062	60	.0075
Fertilizer.....	113,000 sacks	11,300	226,000	100	.0075
Fruit.....	425 crates	32	1,063	80	.01
Grain.....	8,831 sacks	662	22,075	100	.005
Hay and feed.....	521 bales	26	521	80	.005
Live stock.....	12 head	6	2,400	90	.0125
Logs:					
Cottonwood.....	107,579 feet	160	773	40	()
Cypress.....	5,967 feet	12	118	40	()
Pine.....	30,843 feet	61	272	60	()
Lumber.....	127,500 feet	275	2,750	90	.01
Manufactured iron and steel.....	18,312 packages	1,823	218,760	125	.01
Miscellaneous merchandise.....	256,475 packages	25,648	3,590,720	100	.01
Oil.....	37,500 gallons	150	7,500	130	.005
Resin.....	10,750 barrels	2,688	80,000	75	.005
Salt.....	1,410 sacks	141	1,410	140	.0075
Shingles.....	95,000	16	380	100	.0075
Stone.....	18 tons	18	900	150	.01
Sugar, honey, and sirup.....	235 barrels	46	7,363	90	.0075
Ties, cross.....	490	44	255	65	.005
Turpentine.....	1,425 barrels	285	35,625	52	.005
Total.....		44,565	4,229,126		
RECAPITULATION.					
Freight traffic:					
Upstream.....		25,540	3,640,173		
Downstream.....		44,565	4,229,126		
Total.....		70,105	7,869,299		
Decrease from last year.....		28,337	2,234,457		

¹ Rafted.

The above decrease was due to the unsettled condition of the cotton, lumber, timber, and naval-stores market. This decrease is, in all probability, a temporary one.

Number of ton-miles of freight transported:	
Upstream.....	2,774,000
Downstream.....	4,399,195
Total.....	7,173,195
Expenditure for the year on this improvement.....	\$124,164.25
Expenditure per ton-mile of freight transported.....	\$0.0173

7. CHANNEL FROM APALACHICOLA RIVER TO ST. ANDREWS BAY, FLA.

The only work done on this improvement during the fiscal year was three days' snagging by the snag boat *Chattahoochee*, using hired labor, March 29, 30, and 31. The following were removed: 50 snags, 17 logs, and 29 trees, at a field cost of \$416.41.

The money expended was as follows, all work being for maintenance:

Outstanding liabilities from previous fiscal year.....	\$4,649.45
Snagging operations.....	\$416.41
Minor repairs to plant.....	996.83
Care of plant.....	1,463.53
Office expenses and contingencies.....	720.85
	3,597.12
Outstanding liabilities at end of fiscal year.....	35.00
	3,562.12
Actual expenditures during the year.....	8,211.57

APPROPRIATIONS.

Present project:	
June 25, 1910.....	\$100,000
Feb. 27, 1911.....	150,000
July 25, 1912.....	70,000
Mar. 4, 1913.....	130,000
Oct. 2, 1914 (allotment Oct. 7, 1914).....	65,000
July 27, 1916.....	10,000
Total.....	525,000
Receipts from sales.....	205
Grand total.....	525,205

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Registered tugs.....	1	12	.....
Unregistered:			
Barges.....	2	200	.....
Rafts.....	8	.....	.....
Total.....	11	212	.....

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
GOING EAST.					
Logs, pine.....	169,045 feet.....	338	\$1,526	Miles. 11	(¹)
GOING WEST.					
Logs, pine.....	118,420 feet.....	237	1,062	8	(¹)
Lumber, pine.....	100,000 feet.....	200	2,000	32	(²)
Total.....		437	3,062		
RECAPITULATION.					
Freight traffic:					
Going east.....		338	1,526		
Going west.....		437	3,062		
Total.....		775	4,588		

¹ Rafted.² Barged.

Number of ton-miles of freight transported:

East.....	3,718
West.....	8,286
Total.....	12,010
Expenditures for the year on this improvement.....	\$56,667.09
Expenditures per ton-mile of freight transported.....	\$4.7167

8. ST. ANDREWS BAY, FLA.

Dredging for maintenance and for shifting the channel was again undertaken during the fiscal year, it having been found that the former channel was not as favorably located as desirable, and it was thought that a slight modification would result in a considerable decrease in maintenance charges.

The U. S. hopper dredge *Charleston* was rented from the Mobile district and reached St. Andrews Bay on January 9, 1916, beginning work on the 14th and continuing until the end of the fiscal year. Dredging was confined chiefly to the outer bar, although work was also done on Camel Back Shoals. Before work was begun by the dredge *Charleston* a survey of the outer bar was made and short ranges established. A study of the survey warranted the relocation of the channel lines, on which work the *Charleston* was engaged. A total of 300,190 cubic yards of material was removed, at a cost of \$17,632.41, the unit cost per yard being 5.8 cents. The amount expended was as follows:

Outstanding liabilities from previous year.....	\$8,552.85
Operating dredge <i>Charleston</i>	\$17,632.41
Repairs to plant.....	6,255.58
Care of plant.....	3,059.92
Office expenses and contingencies.....	3,905.51
Cost of work.....	30,853.42
Outstanding liabilities.....	2,897.96
	27,955.46
Actual expenditures.....	38,508.81

APPROPRIATIONS.

Present project:	
June 25, 1910.....	\$75,000
Mar. 4, 1911 (sundry civil act).....	128,560
Oct. 2, 1914 (allotment Oct. 7, 1914).....	98,000
Mar. 4, 1915 (allotment Apr. 2, 1915).....	25,000
Mar. 4, 1915 (allotment Dec. 15, 1915).....	15,000
Total.....	279,560
Received for rent dredge <i>Caucus</i>	3,355
Grand total.....	282,915

COMMERCIAL STATISTICS.

Freight traffic, calendar year 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
EXPORTS.					
FOREIGN.					
Lumber, pine.....	15,988,307 feet.....	31,917	\$319,176	Miles. 11	(1)
Piling, pine.....	40.....	12	120	11	(1)
Shingles, cypress.....	143,650.....	24	574	11	(1)
Timber, pine.....	781,000 feet.....	1,563	15,620	11	(1)
Total.....		33,515	335,490		
COASTWISE.					
Cotton.....	4,648 bales.....	1,162	278,880	11	(1)
Fruit.....	33 crates.....	2	88	11	\$0.04
Grain.....	55 sacks.....	4	138	11	.02
Lumber, pine.....	16,746,000 feet.....	33,494	334,939	13	(1)
Do.....	2,357,628 feet.....	4,715	47,156	12	(1)
Manufactured iron and steel.....	507 packages.....	25	600	11	.04
Miscellaneous merchandise.....	2,031 packages.....	203	28,420	11	.065
Oil.....	150 gallons.....	1	30	11	.048
Resin.....	22,404 barrels.....	5,601	179,232	11	.015
Shingles.....	315,350.....	25	1,260	12	(1)
Ties, cross.....	320,223.....	28,820	192,134	11	(1)
Turpentine.....	6,083 barrels.....	1,257	150,825	11	.015
Total.....		75,336	1,213,697		
IMPORTS.					
COASTWISE.					
Brick.....	755,181.....	2,221	5,285	11	.02
Cement.....	10,034 sacks.....	502	5,017	11	.0149
Coal.....	14 tons.....	14	70	11	.0257
Cotton seed.....	5,237 sacks.....	261	10,474	11	.024
Cottonseed meal.....	203 sacks.....	10	508	11	.017
Fertilizer.....	7,223 sacks.....	722	14,440	11	.024
Fruit.....	4,536 crates.....	227	11,340	11	.035
Grain.....	51,091 sacks.....	3,832	127,728	11	.02
Hay and feed.....	18,917 bales.....	946	18,917	11	.02
Live stock.....	4 head.....	2	400	11	.0258
Manufactured iron and steel.....	17,119 packages.....	856	34,240	11	.045
Miscellaneous merchandise.....	109,504 packages.....	10,950	1,533,000	11	.044
Oil.....	89,000 gallons.....	345	13,800	11	.0396
Salt.....	5,788 sacks.....	579	5,788	11	.015
Sugar.....	824 barrels.....	161	25,708	11	.03
Total.....		21,628	1,806,715		
RECAPITULATION.					
Total exports:					
Foreign.....		33,515	335,490		
Coastwise.....		75,336	1,213,697		
Total imports, coastwise.....		21,628	1,806,715		
Total commerce.....		130,479	3,355,902		
Increase over last year.....		14,488	1,130,522		

¹ Cargo.² Barged.

There are no imports from foreign ports into this harbor.

Statement of vessels at the port of St. Andrews, Fla., for the calendar year ending Dec. 31, 1915.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Steamers.....	13	2	15	15,414
Sailing.....	31	26	57	26,296
Total.....	44	28	72	41,710

In addition to the above the following vessels are regularly engaged in the business of the port:

Class.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	1	281	913
Gasoline launches.....	1	85	
Tugs.....	2	140	
Unregistered barges.....	12	3,000	
Total.....	16	3,506	

Number of ton-miles of freight transported:

Exports—		
Foreign.....		368,665
Coastwise.....		900,451
Imports, coastwise.....		237,908
Total.....		1,507,024
Expenditures for the year on this improvement.....		\$46,913.18
Expenditure per ton-mile of freight transported.....		\$0.0311

9. CHOCTAWHATCHEE RIVER, FLA. AND ALA.

Four snag boats, the *Choctawhatchee*, *Escambia*, *Geneva*, and *Conecuh*, operated by hired labor, worked on this stream from July 1, 1915, to December 31, 1915, clearing the river from the mouth of the Holmes River to a point 93 miles above. In addition to this, the snag boat *Choctawhatchee* was fitted with an 8-inch centrifugal pump and during March and April of 1916 cleared the bar at the mouth of Choctawhatchee River, known as Cypress Top Bar, dredging a channel 950 feet long, at a unit cost of 30 cents per cubic yard. This excessive unit cost is due to the cost of transferring plant and rigging the boat for the work, but was more economical than transferring a dredge from other work would have been.

The work accomplished was as follows, all being for maintenance:

Character of work.	Above Geneva.	Below Geneva.	Total.
Removed from channel:			
Small snags..... number.....	1,645	2,308	3,953
Large snags..... do.....	1,609	1,899	3,508
Saw logs..... do.....	975	2,122	3,908
Trees..... do.....	1,331	2,988	4,319
Stumps..... do.....	89	133	222
Piles..... do.....	105	17	122
Rock..... cubic yards.....	99	6	105
Sand (Cypress top)..... do.....		2,453	2,453
Removed from bank:			
Trees..... number.....	32	2,182	2,214
Brush cut..... cords.....	14		14
Wood cut..... do.....	121	222	343

The money expended was as follows:

Outstanding liabilities from previous year		\$3, 576. 24
Operating snag boat <i>Choctawhatchee</i>	\$5, 013. 75	
Operating snag boat <i>Escambia</i>	4, 632. 95	
Operating snag boat <i>Geneva</i>	4, 118. 90	
Operating snag boat <i>Conecuh</i>	3, 384. 00	
Operating launch <i>Vernon</i>	436. 73	
Repairs to snag boat <i>Choctawhatchee</i>	1, 990. 88	
Care of plant and office expenses	1, 625. 04	
Cost of work	21, 202. 25	
Less outstanding liabilities at close of fiscal year	125. 00	
		21, 077. 25
Actual expenditures during the year		24, 653. 49

APPROPRIATIONS.

Previous project (see H. Doc. 1491. 63d Cong., 3d sess., p. 427).....¹ \$15, 000. 00
 Present project:

June 23, 1874	\$5, 000. 00	
Mar. 3, 1875	5, 000. 00	
Aug. 14, 1876	5, 000. 00	
Mar. 3, 1879	5, 000. 00	
June 14, 1880	7, 000. 00	
Mar. 3, 1881	10, 000. 00	
Aug. 2, 1882	² 18, 000. 00	
July 5, 1884	15, 000. 00	
Aug. 5, 1886	15, 000. 00	
Aug. 11, 1888	10, 000. 00	
Sept. 19, 1890	12, 500. 00	
July 13, 1892	12, 500. 00	
Aug. 18, 1894	6, 000. 00	
June 3, 1896	5, 000. 00	
Mar. 3, 1899	16, 000. 00	
June 13, 1902	³ 16, 000. 00	
June 13, 1902 (allotment May 31, 1904)	3, 000. 00	
Mar. 3, 1905	⁴ 10, 000. 00	
Mar. 3, 1905 (allotment July 28, 1905)	2, 000. 00	
Mar. 3, 1905 (allotment July 28, 1906)	300. 00	
Mar. 2, 1907	⁵ 10, 000. 00	
Mar. 3, 1909 (allotment April 9, 1909)	5, 000. 00	
June 25, 1910	⁶ 5, 000. 00	
Feb. 27, 1911	⁷ 5, 000. 00	
July 25, 1912	⁸ 8, 000. 00	
Mar. 4, 1913	⁹ 9, 000. 00	
Oct. 2, 1914 (allotment Oct. 7, 1914)	¹⁰ 20, 000. 00	
Mar. 4, 1915 (allotment April 2, 1915)	¹¹ 25, 000. 00	
July 27, 1916	20, 000. 00	
		285, 300. 00
Total		300, 300. 00
Carried from surplus fund (1852)		2, 123. 38
Net total		298, 176. 62
Receipts from sales		31. 50
Grand total		298, 208. 12

¹ The act of June 15, 1844, appropriated \$10,000 for Choctawhatchee and Holmes Rivers.

² Part of an appropriation of \$20,000, of which \$2,000 was to be expended on Lagrange Bayou, Fla.

³ Includes Cypress Top outlet.

⁴ Of which \$6,000 shall be expended between Newton and Geneva, Ala., and \$4,000 on Cypress Top outlet.

COMMERCIAL STATISTICS.

[Calendar year 1914.]

Vessel classification.

Class.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	1	63	96
Gasoline launch.....	1	15	
Schooner.....	1	20	
Unregistered rafts.....	108		
Total.....	108	98	96

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
UPSTREAM.					
Brick.....	37,500.....	94	\$263	Miles. 28	\$0.0192
Cement.....	600 sacks.....	30	300	28	.042
Fertilizer.....	3,000 sacks.....	300	6,000	23	.0216
Fruit.....	1,080 crates.....	54	2,700	28	.045
Grain.....	43,200 sacks.....	3,240	106,500	28	.0218
Hay and feed.....	6,500 bales.....	325	6,500	28	.0216
Lumber.....	150,000 feet.....	300	3,000	28	.015
Manufactured iron and steel.....	9,000 packages.....	450	18,000	28	.0162
Miscellaneous merchandise.....	19,300 packages.....	1,980	270,000	28	.026
Oil.....	25,000 gallons.....	100	5,000	28	.026
Salt.....	500 sacks.....	50	500	28	.025
Shingles.....	200,000.....	40	800	28	.025
Stone.....	15 tons.....	15	300	28	.025
Sugar.....	500 barrels.....	88	15,600	28	.0222
Total.....		7,016	436,963		
DOWNSTREAM.					
Ash logs.....	291,840 feet.....	582	5,840	14	(¹)
Cotton.....	1,500 bales.....	375	90,000	28	.0225
Cotton seed.....	500 sacks.....	25	1,000	28	.0215
Cypress logs.....	780,000 feet.....	1,170	15,600	13	(¹)
Pine logs.....	6,980,000 feet.....	12,720	63,600	16	(¹)
Resin.....	25,000 barrels.....	6,250	200,000	28	.015
Ties, cross.....	8,000.....	720	4,000	28	.015
Turpentine.....	8,000 barrels.....	1,600	200,000	28	.015
Wool.....	75 bales.....	8	2,625	28	.0225
Total.....		23,450	582,665		
RECAPITULATION.					
Freight traffic:					
Upstream.....		7,016	436,963		
Downstream.....		23,450	582,665		
Total.....		30,466	1,019,627		
Increase over last year.....		5,026	99,839		

¹ Rafted.

Number of ton-miles of freight transported:

Upstream.....	196,448
Downstream.....	478,262
Total.....	674,710
Expenditures for the year on this improvement.....	\$34,611.87
Expenditure per ton-mile of freight transported.....	\$0.0611

10. HOLMES RIVER, FLA.

Snagging operations were carried out on this river during the month of January, 1916, by snag boats *Choctawhatchee*, *Escambia*, *Geneva*, and *Conecuh*, attended by gasoline launch *Vernon*. Work accomplished was as follows:

Removed from channel:	
Small snags	94
Large snags	144
Saw logs	47
Trees	184
Stumps	41
Rock	2
	cubic yards
Removed from banks:	
Trees	1,713
Brush cut	103
Wood cut	65
	cords
	do

The money expended was as follows, all work being for maintenance:

Operating snag boat <i>Choctawhatchee</i>	\$691.81
Operating snag boat <i>Escambia</i>	683.20
Operating snag boat <i>Geneva</i>	580.48
Operating snag boat <i>Conecuh</i>	478.65
Operating launch <i>Vernon</i> as tender	51.18
Office expenses and contingencies	530.61
Cost of work	3,015.98
Outstanding liabilities at close of fiscal year	159.12
Actual expenditures during year	2,856.81

APPROPRIATIONS.

To Aug. 10, 1888 (see H. Doc. 1491, 63d Cong., 3d sess., p. 465)	\$4,000.00
Present project:	
Aug. 11, 1888	\$3,000.00
Sept. 19, 1890	3,000.00
Apr. 28, 1904 (allotment Aug. 3, 1904)	2,000.00
Mar. 3, 1905	2,000.00
Mar. 2, 1907	2,000.00
Mar. 3, 1909 (allotment Apr. 10, 1909)	2,000.00
June 25, 1910	2,000.00
Feb. 27, 1911	1,000.00
July 25, 1912	2,000.00
Mar. 4, 1913	2,500.00
Mar. 4, 1915 (allotment Apr. 2, 1915)	5,000.00
	26,500.00
Total	30,500.00
Receipts from sales	2.60
Grand total	30,502.60

¹ The act of Aug. 2, 1882, appropriated \$20,000 for Choctawhatchee River, Fla. and Ala., of which \$2,000 was applied to Lagrange Bayou.

² The act of Mar. 3, 1899, reappropriated for Holmes River so much of the unexpended balance as was necessary, having been originally appropriated for Lagrange Bayou.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	1	68	95
Gasoline launch.....	1	15	.....
Total.....	2	78	95

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
UPSTREAM.				<i>Miles.</i>	
Brick.....	37,500.....	94	\$263	28	\$0.0225
Cement.....	600 sacks.....	30	300	28	.042
Fertilizer.....	3,000 sacks.....	300	6,000	28	.0216
Fruit.....	1,080 crates.....	54	3,700	28	.045
Grain.....	26,700 sacks.....	2,732	91,750	28	.025
Hay and feed.....	5,280 bales.....	264	5,280	28	.0216
Lumber.....	30,000 feet.....	60	600	28	.015
Manufactured iron and steel.....	7,000 packages.....	350	14,000	28	.0162
Miscellaneous merchandise.....	16,300 packages.....	1,630	228,200	28	.026
Oil.....	18,000 gallons.....	90	3,600	28	.027
Salt.....	800 sacks.....	50	500	28	.025
Stone.....	15 tons.....	15	300	28	.025
Shingles.....	100,000.....	20	400	28	.025
Sugar.....	500 barrels.....	58	15,600	28	.0222
Total.....		5,797	368,493		
DOWNSTREAM.					
Cotton.....	1,500 bales.....	375	90,000	28	.0225
Cotton seed.....	500 sacks.....	25	1,000	28	.0215
Pine logs.....	822,000 feet.....	1,644	16,440	12	(¹)
Resin.....	18,680 barrels.....	4,662	149,200	28	.015
Ties, cross.....	8,000.....	720	4,000	28	.016
Turpentine.....	6,230 barrels.....	1,246	155,750	28	.015
Wool.....	75 bales.....	8	2,625	28	.0225
Total.....		8,680	419,015		
RECAPITULATION.					
Freight traffic:					
Upstream.....		5,797	368,493		
Downstream.....		8,680	419,015		
Total.....		14,477	787,508		
Increase over last year.....		1,193	95,520		

¹ Rafted.

Number of ton-miles of freight transported:

Upstream.....	162,316
Downstream.....	216,736
Total.....	379,052
Expenditures for the year on this improvement.....	\$175.00
Expenditure per ton-mile of freight transported.....	\$0.00046

11. NARROWS IN SANTA ROSA SOUND, FLA.

The pipe-line dredge *Blackwater*, operated by hired labor, began operations on this improvement January 17, 1916, and continued until February 10, 1916. During this period 43,726 cubic yards of material were removed from five shoals, totaling a distance of 4,181 feet. The field cost of this work, which was all for maintenance, was \$7,479.33. Unit cost was 17.1 cents per yard. This excessive unit cost is due to the fact that it was necessary to tow the plant long distances to and from the locality and to the further fact that the work was scattered, a comparatively small amount being done at each point.

The money expended was as follows:

Outstanding liabilities from previous year		\$8. 56
Cost of operating dredge <i>Blackwater</i>	\$7, 479. 33	
Office, engineering, and contingent expenses	1, 781. 90	
Minor repairs to plant	289. 67	
Care of plant	949. 17	
Cost of work	10, 450. 07	
Outstanding liabilities	440. 57	
		10, 009. 50
Actual expenditures for the year		10, 018. 06

APPROPRIATIONS.

Present project:		
June 25, 1910		\$24, 000
Oct. 2, 1914 (allotment Oct. 7, 1914)		5, 000
Mar. 4, 1915 (allotment Apr. 2, 1915)		5, 000
Total		34, 000

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers	2	120	1, 992
Schooners	6	158	
Gasoline launches	2	51	1, 040
Tugs	1	62	
Unregistered:			
Barges	12	840	
Rafts	6		
Total	29	1, 281	3, 023

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
GOING EAST.					
Brick.....	111,800.....	279	\$788	Miles. 40	\$0.02
Cement.....	2,100 sacks.....	108	1,060	40	.02
Coal.....	185 tons.....	185	775	40	.0226
Cotton seed.....	15,000 sacks.....	750	15,000	40	.0215
Fertilizer.....	5,100 sacks.....	510	10,200	40	.025
Fruit.....	2,130 crates.....	157	7,825	40	.025
Grain.....	61,465 sacks.....	4,610	153,663	40	.025
Hay and feed.....	48,818 bales.....	2,441	48,818	40	.0286
Live stock.....	68 head.....	30	5,000	40	.07
Lumber.....	500,000 feet.....	1,000	10,000	40	.025
Manufactured iron and steel.....	34,614 packages.....	1,731	60,240	40	.025
Miscellaneous merchandise.....	71,300 packages.....	7,130	998,200	40	.038
Oil.....	101,200 gallons.....	404	20,240	40	.02
Salt.....	5,850 sacks.....	585	5,850	40	.0226
Shingles.....	250,000.....	42	1,000	40	.015
Stone.....	15 tons.....	15	300	40	.025
Sugar.....	725 barrels.....	141	22,620	40	.025
Total.....		20,065	1,370,564		
GOING WEST.					
Ash logs.....	291,840 feet.....	582	5,840	40	(¹)
Cotton.....	3,008 bales.....	752	180,480	40	.0225
Cotton seed.....	500 sacks.....	25	1,000	40	.0215
Fruit.....	450 crates.....	28	1,125	40	.025
Live stock.....	17 head.....	8	1,800	40	.07
Manufactured iron and steel.....	846 packages.....	43	1,720	40	.035
Miscellaneous merchandise.....	3,000 packages.....	300	42,000	40	.038
Pine lumber.....	1,022,000 feet.....	2,044	20,044	40	.015
Do.....	6,575,860 feet.....	13,151	131,517	40	(²)
Resin.....	42,130 barrels.....	10,542	337,040	40	.0215
Tar, cross.....	55,586.....	4,982	27,798	40	.016
Turpentine.....	13,510 barrels.....	3,082	340,250	40	.0215
Wood.....	100 cords.....	100	300	40	.0375
Total.....		35,514	1,000,609		
RECAPITULATION.					
Freight traffic:					
Going east.....		20,065	1,370,564		
Going west.....		35,514	1,000,609		
Total.....		55,609	2,461,173		
Increase over last year.....		6,064	406,334		

¹ Rafted.² Barged.

Number of ton-miles of freight transported:

East.....	808,400
West.....	1,424,560
Total.....	2,227,960
Expenditures for the year on this improvement.....	\$515.17
Expenditure per ton-mile of freight transported.....	\$0.00023

12. BLACKWATER RIVER, FLA.

The U. S. pipe-line dredge *Blackwater*, operated by hired labor, began work on this improvement on February 16, 1916, and con-

tinued until April 20, 1916. During this period a total of 131,549 cubic yards of material was removed as follows:

Locality.	Length of cut.	Material removed.
	<i>Linear feet.</i>	<i>Cubic yards.</i>
Maintenance, Hunts Bar.....	1,200	10,729
New work:		
Dog Farm Shoals.....	1,141	16,124
Mill Island Crossing.....	1,083	15,732
Bay Point.....	10,510	85,964
Total.....	13,944	131,549

The cost of dredging was \$4,724.29, of which sum \$403.95 was expended for maintenance. This work completed the project depth and width. The unit cost for dredging was 3.6 cents per cubic yard. The money expended was as follows:

Operating dredge <i>Blackwater</i>	\$4,727.29
Outstanding liabilities.....	137.12

Actual expenditures for the year..... 4,587.17

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 410).....	\$5,000
Present project:	
Mar. 3, 1905.....	\$10,000
Mar. 2, 1907.....	5,000
June 25, 1910.....	25,000
Mar. 4, 1915 (allotment Apr. 2, 1915).....	5,000
	45,000
Total.....	50,000

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	3	160	3,263
Gasoline launches.....	4	108	2,208
Tugs.....	4	117	.....
Unregistered:			
Barges.....	14	980	.....
Rafts.....	313	.....	.....
Total.....	337	1,365	5,463

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
UPSTREAM.					
Brick.....	30,000.....	85	\$270	Miles. 7	\$0.04
Cement.....	2,462 sacks.....	123	1,231	7	.0425
Coal.....	50 tons.....	50	250	7	.0425
Fertilizer.....	1,600 sacks.....	160	3,200	7	.0425
Fruit.....	992 crates.....	50	2,480	7	.05
Grain.....	32,860 sacks.....	2,465	82,160	7	.035
Hay and feed.....	18,465 bales.....	923	18,465	7	.0325
Live stock.....	19 head.....	9	1,900	7	.24
Lumber.....	84,000 feet.....	168	1,680	7	.0425
Do.....	3,000,000 feet.....	6,000	60,000	3	(¹)
Manufactured iron and steel.....	4,060 packages.....	203	8,120	7	.04
Miscellaneous merchandise.....	35,135 packages.....	3,513	491,820	7	.035
Oil.....	33,730 gallons.....	135	6,746	7	.0425
Salt.....	2,548 sacks.....	255	2,548	7	.0425
Sand and gravel.....	500 sacks.....	50	250	7	.0425
Shingles.....	214,000.....	36	856	7	.0425
Sugar.....	526 barrels.....	103	16,411	7	.0425
Total.....		14,328	698,377		
DOWNSTREAM.					
Brick.....	5,000.....	14	35	7	.04
Cotton.....	62 bales.....	15	3,720	7	.035
Fruit.....	100 crates.....	6	250	7	.05
Grain.....	663 sacks.....	50	1,658	7	.035
Hay and feed.....	500 bales.....	25	500	7	.0325
Live stock.....	56 head.....	28	5,600	7	.24
Logs, pine.....	9,500,000 feet.....	19,000	57,000	3	(¹)
Lumber.....	64,000 feet.....	128	1,280	7	.0425
Do.....	35,000,000 feet.....	70,000	700,000	5	(¹)
Manufactured iron and steel.....	263 packages.....	12	480	7	.04
Miscellaneous merchandise.....	2,763 packages.....	276	38,640	7	.035
Poles, juniper.....	1,500.....	450	4,500	16	(¹)
Rosin.....	31,189 barrels.....	7,779	249,512	17	.025
Shingles.....	344,000.....	57	1,376	7	.0425
Timber, pine.....	9,000,000 feet.....	18,000	180,000	8	(¹)
Turpentine.....	4,217 barrels.....	850	105,425	17	.025
Total.....		116,790	1,349,976		
RECAPITULATION.					
Freight traffic:					
Upstream.....		14,328	698,377		
Downstream.....		116,790	1,349,976		
Total.....		131,118	2,048,353		
Decrease from last year.....		5,799	81,686		

Barged.

Rafted.

Number of ton-miles of freight transported:

Upstream.....	76,296
Downstream.....	710,870
Total.....	787,166

13. HARBOR AT PENSACOLA, FLA.

No active operations were carried on during the fiscal year.

The money expended was as follows:

Outstanding liabilities from the previous year.....	\$144.00
Repairs to plant.....	\$8,323.48
Office expenses, main office.....	1,720.67
Care of plant.....	7,477.30
	17,521.45
Outstanding liabilities.....	305.00
	17,216.45
Actual expenses during year.....	17,860.45

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 524) -- \$725,956.94

Present project:

June 13, 1902.....¹\$220,000.00

Mar. 3, 1905.....100,000.00

Mar. 2, 1907.....100,000.00

Mar. 3, 1909 (allotment Apr. 9, 1909).....110,000.00

June 25, 1910.....75,000.00

Feb. 27, 1911.....25,000.00

Mar. 4, 1915 (allotment Apr. 2, 1915).....25,000.00

July 27, 1916.....20,000.00

675,000.00

Total.....1,400,956.94

Carried to surplus fund (1914) from act of Mar. 3, 1909.....13,881.92

Net total.....1,387,075.02

Receipts for salvage by dredge *Caucus* at navy yard, Pensacola, Fla.....14,551.76Receipts for rental of dredge *Caucus*.....5,070.09

Receipts from sales.....562.70

Grand total.....1,407,259.57

Commercial statistics.

Freight traffic, calendar year 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
EXPORTS.					
FOREIGN.					
				Miles.	
Ash logs.....	527,996 feet.....	1,055	\$17,155	11.25	(2)
Ash lumber.....	797,000 feet.....	1,594	35,248	11.25	(2)
Bolts, tie.....	291 kegs.....	16	893	11.25	(2)
Cedar logs.....	12,100 feet.....	18	1,750	11.25	(2)
Clips.....	132 kegs.....	11	630	11.25	(2)
Coal, bunker.....	87,663 tons.....	87,663	319,093	11.25	(2)
Coal, export.....	1,746 tons.....	1,746	6,328	11.25	(2)
Coffee.....	100 bags.....	10	2,400	11.25	(2)
Cotton.....	98,449 bales.....	24,612	5,906,940	11.25	(2)
Cottonseed oil cake.....	14,302 tons.....	14,302	420,846	11.25	(2)
Cypress lumber.....	28,000 feet.....	42	938	11.25	(2)
Ferromanganese ore.....	2,425 barrels.....	1,724	125,952	11.25	(2)
Flour.....	11,000 sacks.....	1,210	76,495	11.25	(2)
Gum lumber.....	163,000 feet.....	82	4,890	11.25	(2)
Gum staves.....	6,778 bundles.....	146	2,436	11.25	(2)
Handles.....	1,189 bundles.....	37	5,213	11.25	(2)
Hardwood lumber.....	786,000 feet.....	1,915	27,595	11.25	(2)
Lumber, pine.....	79,175,639 feet.....	158,351	1,583,513	11.25	(2)
Oak lumber.....	1,348,000 feet.....	3,370	53,842	11.25	(2)
Oak spokes.....	39,292 bundles.....	140	4,562	11.25	(2)
Oak staves.....	105,062.....	649	22,066	11.25	(2)
Pig iron.....	10,070 tons.....	10,070	153,300	11.25	(2)
Pine pickets.....	661,000 feet.....	1,322	13,220	11.25	(2)
Pine tar.....	6,399 barrels.....	1,600	38,394	11.25	(2)
Pitch.....	71 barrels.....	18	210	11.25	(2)
Poplar logs.....	71,000 feet.....	142	1,950	11.25	(2)
Poplar lumber.....	92,175 feet.....	184	3,687	11.25	(2)
Poplar timber.....	345,524 feet.....	691	13,821	11.25	(2)

¹ Includes \$150,000 appropriated for construction of seagoing dredge *Caucus* and \$26,000 allotted by Chief of Engineers for the same purpose.² Cargo.

Freight traffic, calendar year 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
EXPORTS—Continued.					
FOREIGN—continued.					
				Miles.	
Rails, steel.....	2,575 tons.....	2,575	\$72,156	11.25	(1)
Railroad sleepers.....	14,178,887 feet.....	28,358	283,578	11.25	(1)
Resin.....	183,007 barrels.....	40,668	823,532	11.25	(1)
Splices, railroad.....	720 bundles.....	20	678	11.25	(1)
Steel billets.....	9,044 tons.....	9,044	183,589	11.25	(1)
Steel ties.....	10,770.....	554	14,881	11.25	(1)
Ties, railroad.....	38,673.....	3,480	20,300	11.25	(1)
Timber, pine.....	43,670,858 feet.....	87,342	873,417	11.25	(1)
Tobacco.....	6,347 hogsheads.....	4,018	753,735	11.25	(1)
Turpentine.....	15,450 barrels.....	3,290	386,250	11.25	(1)
Wire, barbed.....	400 reels.....	10	465	11.25	(1)
Wire rods.....	22,806 coils.....	1,959	56,453	11.25	(1)
Total.....		494,038	12,312,431		
COASTWISE.					
Barrels.....	7,500.....	200	15,000	18.00	\$0.085
Brick.....	891,500.....	2,547	6,240	11.00	.0825
Cement.....	17,582 sacks.....	894	8,941	11.00	.025
Coal.....	224 tons.....	234	1,170	11.00	.0325
Coal, bunker.....	6,537 tons.....	6,537	23,795		
Cotton.....	147 bales.....	37	8,820	11.25	.022
Cotton seed.....	24,390 sacks.....	1,220	48,780	11.00	.0213
Fertilizer.....	14,003 sacks.....	1,400	28,000	11.00	.06
Fruit.....	9,557 crates.....	478	23,892	11.00	.045
Grain.....	157,291 sacks.....	11,796	303,227	11.00	.025
Hay and feed.....	90,648 bales.....	4,532	90,648	11.00	.030
Live stock.....	98 head.....	49	9,800	11.00	.06
Lumber, pine.....	500,000 feet.....	1,000	10,000	5.00	.025
Do.....	4,598,355 feet.....	9,197	91,967	11.25	(1)
Manufactured iron and steel.....	58,877 packages.....	2,944	117,760	11.00	.085
Miscellaneous merchandise.....	259,507 packages.....	25,950	3,723,000	11.00	.0965
Oil.....	225,630 gallons.....	905	45,126	11.00	.0861
Resin.....	23,081 barrels.....	5,770	184,648	11.25	.008
Salt.....	17,588 sacks.....	1,759	17,588	11.00	.025
Shingles.....	580,000.....	93	2,320	11.00	.0835
Stone.....	15 tons.....	15	300	5.00	.025
Sugar.....	2,212 barrels.....	431	69,012	11.00	.083
Ties, cross.....	89,684.....	8,071	53,810	11.25	(1)
Timber, pine.....	1,733,175 feet.....	3,466	34,663	11.25	(1)
Turpentine.....	310 barrels.....	62	7,750	11.25	.0166
Wool.....	47 bales.....	5	1,500	11.25	.0933
Total.....		89,590	5,027,757		
IMPORTS.					
FOREIGN.					
Cedar logs.....	109,120 feet.....	163	7,065	11.25	(1)
Chalk.....	2,675 tons.....	2,675	1,450	11.25	(1)
Manganese ore.....	10,800 tons.....	10,800	97,203	11.25	(1)
Manure salts.....	468 tons.....	468	4,316	11.25	(1)
Mahogany logs.....	3,942,100 feet.....	11,862	286,520	11.25	(1)
Muriate of potash.....	4,203 tons.....	4,203	128,508	11.25	(1)
Nitrate of soda.....	6,804 tons.....	6,804	326,592	11.25	(1)
Pyrites.....	5,100 tons.....	5,100	17,452	11.25	(1)
Salt.....	609 tons.....	600	2,080	11.25	(1)
Sulphate of potash.....	153 tons.....	153	5,776	11.25	(1)
Whisky.....	120 cases.....	3	415	11.25	(1)
Total.....		42,831	827,347		
COASTWISE.					
Ash logs.....	291,840 feet.....	582	5,840	5.00	(1)
Bedding.....	1,103 barrels.....	276	2,206	18.00	(1)
Brick.....	5,000.....	15	35	11.00	.04
Chips.....	1,342 barrels.....	67	671	18.00	(1)
Cotton.....	3,070 bales.....	768	194,200	5.00	.0225
Cotton seed.....	500 sacks.....	25	1,000	5.00	.0215
Fertilizer.....	20 sacks.....	2	40	11.25	.0222
Fish.....	4,962 tons.....	4,962	591,060	11.00	(1)

¹ Cargo.² Rafted.

Freight traffic, calendar year 1915—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
IMPORTS—continued.					
COASTWISE—continued.					
Fruit.....	5,109 crates.....	288	\$12, 192	11. 00	\$0. 035
Grain.....	6,733 sacks.....	505	16, 893	11. 25	. 0177
Hay and feed.....	500 bales.....	25	500	11. 00	. 0326
Live stock.....	75 head.....	37	7, 500	11. 00	. 075
Lumber, pine.....	1,094,328 feet.....	2, 189	21, 886	5. 00	. 015
Do.....	51,432,828 feet.....	102, 866	1, 028, 657	13. 00	(¹)
Manufactured iron and steel.....	8,500 packages.....	425	17, 000	11. 00	. 04
Miscellaneous merchandise.....	25,653 packages.....	2, 565	359, 100	11. 00	. 0335
Oil.....	14,300 gallons.....	57	2, 880	11. 25	. 0304
Poles, juniper.....	1,500.....	450	4, 500	15. 00	(²)
Resin.....	113,927 barrels.....	28, 482	911, 416	11. 00	. 02
Salt.....	16 sacks.....	1	16	11. 25	. 02
Shingles.....	344,000.....	57	1, 376	11. 00	. 0426
Sugar.....	3,261 barrels.....	635	101, 743	11. 25	. 0148
Ties, cross.....	55,586.....	4, 982	27, 793	5. 00	. 016
Timber, pine.....	44,206,000 feet.....	88, 412	884, 120	13. 00	(²)
Turpentine.....	29,819 barrels.....	5, 964	745, 475	11. 00	. 02
Wood.....	100 cords.....	100	300	5. 00	. 0375
Total.....		244, 707	4, 928, 349		
RECAPITULATION.					
Total exports:					
Foreign.....		494, 088	12, 312, 431		
Coastwise.....		89, 590	5, 027, 757		
Total imports:					
Foreign.....		42, 881	827, 347		
Coastwise.....		244, 707	4, 928, 349		
Total.....		871, 166	23, 095, 884		
Increase over last year.....			276, 765		
Decrease from last year.....		293, 336			

¹ Barged.² Rafted.

Decrease from last year's tonnage report caused by the inability to obtain bottoms for the export lumber, timber, and naval stores trade and for the importation of fertilizer material and mahogany logs. This decrease is in all probability a temporary one.

Statement of vessels for the port of Pensacola, Fla., for the calendar year ending Dec. 31, 1915.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Steamers.....	12	136	148	317, 154
Sailing.....	38	78	116	110, 600
Barges.....	16	.....	16	6, 791
Total.....	66	214	280	434, 545

In addition to the above, the following vessels are regularly engaged in the business of the port:

Class.	Number.	Net registered tonnage.	Passengers.
Registered:			
Steamers.....	8	761	8,618
Tugs.....	15	612	.....
Schooners.....	6	158	.....
Gasoline launches.....	7	244	6,240
Fishing smacks.....	55	2,846	.....
Unregistered:			
Barges.....	33	3,120	.....
Rafts.....	623	.....	.....
Total.....	747	7,741	14,858

Number of ton miles of freight transported:

Exports—	
Foreign.....	5,557,928
Coastwise.....	915,846
Imports—	
Foreign.....	481,849
Coastwise.....	3,026,968
Total.....	9,982,280
Expenditure for the year on this improvement.....	\$7,032.41
Expenditure per ton-mile of freight transported.....	\$0.0007

14. ESCAMBIA AND CONECUH RIVERS, FLA. AND ALA.

There was no work done during the year. The expenditures during the year were \$285.74 for main-office expenses.

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess, p. 448)..... ¹\$10,500.00

Present project:

June 14, 1880.....	¹ \$8,000.00
Mar. 3, 1881.....	¹ 5,000.00
Aug. 2, 1882.....	12,000.00
July 5, 1884.....	¹ 3,000.00
July 5, 1884.....	12,000.00
Aug. 5, 1886.....	12,000.00
Aug. 11, 1888.....	10,000.00
Sept. 19, 1890.....	7,500.00
July 13, 1892.....	8,000.00
Aug. 18, 1894.....	6,000.00
June 3, 1896.....	4,000.00
Mar. 3, 1899.....	5,000.00
June 6, 1900 (allotment July 18, 1900).....	1,500.00
June 13, 1902.....	5,000.00
Mar. 3, 1905.....	10,000.00
Mar. 3, 1905 (allotment Nov. 10, 1906).....	5,000.00
Mar. 2, 1907.....	15,000.00
Mar. 2, 1907.....	² 31,000.00
Mar. 3, 1909 (allotment Apr. 9, 1909).....	5,000.00
June 25, 1910.....	5,000.00
Feb. 27, 1911.....	5,000.00
July 25, 1912.....	5,000.00
Mar. 4, 1913.....	8,000.00
Oct. 2, 1914 (allotment Oct. 7, 1914).....	5,000.00
	193,000.00
Total.....	203,500.00

¹ For Escambia River only.

² For Conecuh River only.

Carried to surplus fund (1888)-----	\$5,500.00	
Transferred under authority of the act of Mar. 4, 1915--	4,800.00	
		\$10,300.00
Net total-----		193,200.00
Receipts from sales-----		3.87
Grand total-----		193,203.87

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	American.	Net registered tonnage.
Registered tugs.....	3	109
Unregistered:		
Barges.....	7	490
Rafts.....	437	
Total.....	447	599

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
DOWNSTREAM.					
Lumber, pine.....	7,500,000 feet.....	15,000	\$150,000	<i>Miles.</i> 40	(¹)
Timber, pine.....	35,000,000 feet.....	70,000	700,000	42	(²)
Total.....		85,000	850,000		
Increase over last year.....		14,088	140,880		

¹ Barged.² Rafted.

There is no upstream freight on this river.

Number of ton-miles of freight transported downstream-----	3,540,000
Expenditures for the year on this improvement-----	\$35.76
Expenditure per ton-mile of freight transported-----	\$0.00001

15. ALABAMA RIVER, ALA.

The pipe-line dredge *Pettus* operated between Montgomery and Selma from the beginning of the fiscal year to December 11, 1915, when plant was tied up for the winter. During this time the dredge removed 287,780 cubic yards of material at a cost of \$18,675.46. Dredge was again placed in commission on June 15, 1916, and worked at Gardners Island for 12 days, when plant was tied up for lack of funds. During this time the dredge filled 680 linear feet of gravel dams at a cost of \$1,958.26.

The snag boat *Wm. J. Twining* worked from the beginning of the fiscal year until December 23, 1915. This boat operated over the entire river several times, running a total distance of 1,550 miles, re-

moving 1,159 obstructions, at a field cost of \$7,243.51; unit cost being \$6.24 each.

Snags removed from river.....	151
Saw logs removed from river.....	67
Trees removed from river.....	149
Trees removed from bank.....	333
Stumps removed from river.....	300
Logs removed from bank.....	159

Total obstructions removed..... 1,159

The towboat *Alabama* was used as tender to the dredge *Pettus* and for towing the plant used in jetty construction. The operating cost of this boat is included in the cost of dredging and jetty construction shown in the tables given below.

Jetty construction was carried on from the beginning of the fiscal year, using the towboat *Alabama*, pile-driver barge *No. 11*, and quarterboats *No. 1* and *No. 2*, and was continued until December 15, 1915. Plant was then laid up for the winter and operations were not resumed until June 8, 1916. Operations were continued until June 27, 1916, when plant was tied up for lack of funds.

The continuous survey of the river, commenced in April, 1915, was continued from the beginning of the fiscal year until September 17, 1915. This survey was completed to Selma, Ala., 83.5 miles below Montgomery, Ala., at a field cost of \$1,770.14. Special surveys were made at Gardners Island and at the Gulf, Florida & Alabama Railroad bridge at Yellow Bluff.

All plant was tied up from the middle of December, 1915, until early in June, 1916, during which time all necessary repairs to plant were made by the United States with hired labor, except for repairs to snag boat *Wm. J. Twining*. This boat was in very poor condition and was taken to Mobile, Ala., on April 12, 1916, to be placed on dry dock; repairs were practically completed at the end of the fiscal year.

The following tabulations show the work accomplished both in jetty construction and in dredging:

Improvements.

Locality.	Miles above mouth.	Jetties.		Dredging.	
		Linear feet.	Cost.	Cubic yards.	Cost.
Three Chutes Bars.....	291	1,947	\$5,575.05	42,450	\$2,310.41
Upper Gause Bar.....	290	714	1,370.36		
Middle Gause Bar.....	289	304	849.30		
Bar below Lower Gause.....	288	372	471.39	36,160	1,847.66
Duncan Bar.....	285	760	635.13		
Washington Bar.....	279	248	1,458.83	20,050	1,067.63
Lower Catoma Bar.....	277			37,800	1,968.55
Opossum Blight Bar.....	275			61,400	3,747.61
Cypress Creek Bar.....	257			13,200	1,050.39
Gordon Bar.....	254			14,400	1,121.34
Bar below Benton.....	239			11,300	921.54
Stewart Bar.....	235			16,600	1,356.84
Lower Brother Bar.....	232			10,150	831.25
Old Hell Bar.....	229			9,870	811.74
Gardners Island.....	226	680	3,585.19	14,400	1,640.38
Hadnot Bar ¹	278	96	104.66		
Lower Catoma Bar ¹	277	492	680.22		
Opossum Blight Bar ¹	275	464	518.58		
Gardners Island ¹	226	1,360	997.36		
Total.....		7,427	16,246.07	287,780	18,675.46

¹ These jetties partially completed.

Maintenance.

Locality.	Miles above mouth.	Jetties.	
		Linear feet.	Cost.
Three Chutes Bars.....	291	2, 121	\$3, 291. 46
Upper Gause Bar.....	290	648	919. 59
Middle Gause Bar.....	289	400	221. 76
Washington Bar.....	279	40	244. 43
Merritt Bar.....	278	35	183. 31
Total.....		3, 244	4, 860. 55

Detailed expenditures for the fiscal year are given below:

Outstanding liabilities from previous year.....		\$10, 600. 00
Jetty construction.....	\$21, 106. 62	
Dredging operations.....	18, 675. 46	
Snagging operations.....	7, 243. 51	
Surveys, mile 38.5 to mile 83.5.....	1, 770. 14	
G., F. & A. R. R. bridge at Yellow Bluf.	229. 57	
Gardners Island.....	207. 44	
Repairs to plant.....	9, 959. 80	
Care of plant.....	6, 648. 20	
Miscellaneous expenses.....	1, 406. 46	
Superintendence and office expenses.....	8, 965. 41	
Cost of work.....	76, 212. 61	
Cost of supplies on hand.....	3, 692. 62	
Total.....	79, 905. 23	
Outstanding liabilities.....	12, 556. 14	
		67, 349. 09
Actual expenditures.....		77, 949. 09
Amount chargeable to improvement.....		47, 196. 88
Amount chargeable to maintenance.....		30, 752. 21
Total.....		77, 949. 09

APPROPRIATIONS.

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 394) --	\$419, 000. 00
Present project:	
Mar. 3, 1905.....	\$100, 000. 00
Mar. 2, 1907.....	200, 000. 00
Mar. 3, 1909 (allotment Apr. 9, 1909).....	110, 000. 00
June 25, 1910.....	85, 000. 00
Feb. 27, 1911.....	75, 000. 00
July 25, 1912.....	75, 000. 00
Mar. 4, 1913.....	100, 000. 00
Oct. 2, 1914 (allotment Oct. 7, 1914).....	50, 000. 00
Mar. 4, 1915 (allotment Apr. 2, 1915).....	75, 000. 00
July 27, 1916.....	100, 000. 00
	970, 000. 00
Total.....	1, 389, 000. 00
Carried to surplus fund (1914) from act of Mar. 3, 1909.....	234. 87
Net total.....	1, 388, 765. 13
Receipts from sales.....	563. 72
Grand total.....	1, 389, 328. 85

¹ In the discretion of the Secretary of War, the scope of this improvement may be extended to include the Alabama and Coosa Rivers between Montgomery and Wetumpka.

² Includes Alabama and Coosa Rivers between Montgomery and Wetumpka.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	Ameri- can.	Net registered tonnage.	Passen- gers.
Registered steamers.....	3	764	12,014
Unregistered:			
Gasoline towboats.....	2	16	-----
Barges.....	8	2,250	-----
Rafts.....	104		-----
Total.....	117	3,030	12,014

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was car- ried.	Rate per ton-mile.
UPSTREAM.				Miles.	
Brick.....	55,000.....	151	\$385	150	\$0.0125
Cement.....	24,400 sacks.....	1,220	12,200	200	.01
Coal.....	15 tons.....	15	75	175	.0126
Cotton.....	4,100 bales.....	1,025	246,000	175	.0172
Cotton seed.....	27,380 sacks.....	1,368	54,720	200	.01
Fertilizer.....	26,876 sacks.....	2,688	53,760	190	.0105
Fruit.....	1,610 crates.....	80	4,025	180	.0278
Grain.....	60,770 sacks.....	4,558	151,925	155	.016
Hay and feed.....	13,190 bales.....	659	13,190	160	.015
Live stock.....	288 head.....	134	33,300	125	.04
Lumber.....	289,500 feet.....	577	5,770	175	.01
Manufactured iron and steel.....	22,551 packages.....	1,128	45,102	185	.0285
Miscellaneous merchandise.....	75,387 packages.....	7,639	1,069,560	190	.0342
Oil.....	32,375 gallons.....	161	6,450	200	.016
Resin.....	6 barrels.....	2	48	200	.01
Salt.....	2,844 sacks.....	284	2,844	200	.01
Shingles.....	564,107.....	94	2,256	185	.012
Stone.....	10 tons.....	10	600	200	.04
Sugar.....	1,058 barrels.....	206	32,010	185	.013
Turpentine.....	31 barrels.....	6	775	200	.01
Total.....		22,005	1,734,965		
DOWNSTREAM.					
Brick.....	70,000.....	200	490	175	.038
Cement.....	1,050 sacks.....	53	525	175	.0115
Coal.....	5 tons.....	6	30	150	.0133
Cotton.....	11,252 bales.....	2,813	675,100	200	.015
Cotton seed.....	21,800 sacks.....	1,093	43,720	200	.01
Fertilizer.....	13,084 sacks.....	1,308	26,160	150	.0133
Fruit.....	315 crates.....	10	778	150	.033
Grain.....	12,303 sacks.....	923	30,738	125	.015
Hay and feed.....	2,139 bales.....	107	2,139	150	.0175
Live stock.....	1,232 head.....	616	24,040	175	.025
Logs, pine.....	2,400,000 feet.....	4,800	24,000	36	(¹)
Lumber, pine.....	2,191,796 feet.....	4,384	43,840	43	(¹)
Do.....	2,091,500 feet.....	4,183	41,830	115	.02
Manufactured iron and steel.....	7,713 packages.....	771	19,275	150	.033
Miscellaneous merchandise.....	45,113 packages.....	4,511	631,540	105	.04
Oil.....	5,500 gallons.....	28	1,100	150	.01
Resin.....	26,287 barrels.....	6,572	210,296	125	.01
Salt.....	960 sacks.....	96	960	150	.0133
Shingles.....	882,800.....	147	3,528	150	.0075
Staves.....	21,000.....	1,575	2,100	200	.00625
Stone.....	4 tons.....	4	160	150	.055
Sugar.....	332 barrels.....	65	19,358	200	.0125
Ties, cross.....	77,728.....	7,766	38,862	120	.0166

¹ Rafted.² Barged.

Freight traffic—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
DOWNSTREAM—continued.					
Timber, hardwood.....	3,720,000 feet.....	11,160	\$111,000	80	(¹)
Turpentine.....	6,060 barrels.....	1,212	151,500	125	\$0.01
Wool.....	28 bales.....	3	840	100	.03
Total.....		54,412	2,096,109		
RECAPITULATION.					
Freight traffic:					
Upstream.....		22,006	1,784,955		
Downstream.....		54,412	2,096,109		
Total.....		76,417	3,881,064		
Decrease from last year.....		35,928	497,493		

¹ Rafted.

The above decrease was due to the unsettled condition of the cotton, lumber, timber, and naval stores market. This decrease is in all probability a temporary one.

Number of ton-miles of freight transported:		
Upstream.....		2,985,215
Downstream.....		6,350,082
Total.....		10,344,897
Expenditure for the year on this improvement.....		\$93,820.12
Expenditure per ton-mile of freight transported.....		\$0.00907

16. COOSA RIVER, GA. AND ALA.

Rome, Ga., to Lock No. 4, Ala.—The dipper dredge *Attalla* and towboat *Leota*, as tender, operated on this improvement from the beginning of the fiscal year to December, 1915, at the first shoal below and near the entrance to the lock at Mayos Bar and at Chicken Shoals. A total of 500 cubic yards of sand, gravel, and mud were removed from the channel near Mayos Bar at a field cost of \$60. At Chicken Shoals 5,240 cubic yards of sand and gravel and 770 cubic yards of rock were removed from the channel at field costs of \$576.40 and \$1,690.46, respectively; 815 cubic yards of rock were blasted in the channel at a field cost of \$2,061.95; 751 cubic yards of stone were quarried at a field cost of \$1,768.27; 84 linear feet of jetties were built at a field cost of \$358.20; 65 overhanging trees were cut at a field cost of \$21.45. The unit costs were as follows: Dredging sand and gravel, 11 cents per cubic yard; dredging rock, \$2.20 per cubic yard; rock blasting in channel, \$2.53 per cubic yard; quarrying stone, \$2.35 per cubic yard; jetties, \$4.26 per linear foot; overhanging trees cut, 33 cents each. A survey of the river from Rome, Ga., to Gadsden, Ala., a distance of 107½ miles, was begun July 1, 1915, and the field work finished December 21, 1915, at a field cost of \$8,384.44. The money expended was as follows:

Outstanding liabilities from previous year.....		\$5,379.51
Dredging.....	\$2,326.86	
Blasting rock.....	2,061.95	
Quarrying.....	1,768.27	
Building jetties.....	358.20	
Cutting and removing overhanging trees.....	21.45	
Cost of logs for cribs, on hand.....	256.23	

Miscellaneous:

Building pontoons for quarter boat.....	\$919. 93
Maintenance of plant and machinery.....	639. 89
Towing fleet from Rome, Ga., to Dam No. 5.....	521. 16
Making and installing gages at Rome, Ga.....	81. 98
Survey of Seaboard Air Line Ry. bridge near Lock No. 3.....	98. 40
Care of fleet.....	705. 52
Renewals and repairs:	
Towboat <i>Leota</i>	388. 01
Dredge <i>Attalla</i>	1, 048. 67
Towboat <i>Coosa</i>	1, 585. 88
Launch <i>Oostanaula</i>	84. 30
Drag-line excavator.....	12. 55
Barge No. 32.....	584. 36
80-foot barge.....	736. 39
Clamshell derrick barge.....	359. 28
Survey from Rome, Ga., to Gadsden, Ala., 107½ miles, at \$78.36 per mile.....	8, 384. 44
Office expenses and contingencies.....	4, 920. 94
Cost of work	27, 864. 66
Less outstanding liabilities at close of year	556. 60
	\$27, 308. 06

Actual expenditures during the year..... 32, 687. 57

Lock and dam at Mayos Bar.—Work of leveling and removing unsightly objects from the reservation was done at a cost of \$135.53. The money was expended as follows:

Outstanding liabilities from previous year.....	\$363. 46
Grading and removing unsightly objects from reservation and river banks.....	\$135. 53
Outstanding liabilities.....	15. 00
	120. 53

Actual expenditures during the year..... 483. 99

Lock in Dam No. 4.—No work was done at this place.

Dam No. 5.—Active work was suspended in December, 1915, and resumed June 1, 1916. At the time of suspension, the east and west abutments and core walls, 406 linear feet of dam, and 70 per cent of the east and west levees had been completed. Since the resumption of work the cofferdam has been extended 240 feet and excavation for foundation begun. The site on the western bank of the river was acquired by condemnation. Difficulties in connection with unwatering and excavation continued in a more aggravated form than during the last fiscal year, and the high costs are solely attributable to the condition of the rock forming the foundation of the dam. At the close of the fiscal year the following work had been accomplished:

Installing:

Engines.....	\$71. 79
Pipe lines, steam and air, including moving.....	1, 031. 49
Lighting system.....	46. 00
	\$1, 149. 28

EAST CORE WALL AND ABUTMENT.

Excavating for foundation, 50 cubic yards, at \$1.126.....	56. 29
Forming.....	586. 27
Concreting, 365 cubic yards, at \$2.769:	
Cement, labor, etc.....	\$766. 19
Sand and gravel.....	244. 55
	1, 010. 74

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Building levee:

Filling 3,548 cubic yards, at \$0.438-----	\$1,554.81	
Paving 282 cubic yards, at \$2.621-----	608.15	
		<u>\$3,816.26</u>

MAIN DAM.

Pumping-----	5,457.13	
Excavating for foundation, 378 cubic yards, at \$2.569-----	971.14	
Forming, foundation-----	277.88	
Forming, main dam-----	1,759.02	
Grouting leaks in foundation-----	149.60	
Concreting foundation, 733 cubic yards, at \$2.417:		
Cement, labor, etc-----	\$1,280.43	
Sand and gravel-----	491.11	
		<u>1,771.54</u>
Concreting main dam, 1,731 cubic yards, at \$2.218:		
Cement, labor, etc-----	\$3,499.78	
Sand and gravel-----	1,159.77	
		<u>4,659.55</u>
Back filling foundation-----	143.17	
		<u>15,194.03</u>

WEST CORE WALL AND ABUTMENT.

Pumping-----	1,083.59	
Excavating for foundation, 4,713.5 cubic yards, at \$0.293--	1,380.06	
Forming-----	1,960.07	
Concreting, 2,169 cubic yards, at \$2.697:		
Cement, labor, etc-----	\$4,397.22	
Sand and gravel-----	1,452.38	
		<u>5,849.60</u>
Building levee:		
Filling, 6,177 cubic yards, at \$0.452-----	2,795.07	
Paving, 101 cubic yards, at \$1.338-----	135.22	
Grouting leaks-----	105.36	
		<u>3,035.65</u>
		<u>13,908.97</u>

PLANT AND GENERAL EQUIPMENT.

Pumps, engines, and other additions to property-----	2,897.95
--	----------

ADDITIONS TO EAST BANK COFFERDAM.

Built and repaired 1,043 linear feet, at \$9.814-----	10,198.18	
Clay filling leaks-----	38.20	
		<u>10,236.38</u>

WEST BANK COFFERDAM.

Completing filling 218 linear feet, at \$1.944-----	423.08
---	--------

REPAIRS TO PLANT.

Towboat <i>Coosa</i> -----	456.36	
Clamshell derrick barge-----	419.90	
Barge No. 32-----	406.63	
80-foot barge-----	242.25	
Boilers and stacks-----	483.39	
Air compressor-----	134.65	
Cable towers-----	66.12	
Water tank-----	78.97	
Quarters and buildings, including addition to quarters----	314.90	
Sand-and-gravel bins-----	122.28	
Miscellaneous-----	1,016.94	
		<u>3,742.39</u>

MISCELLANEOUS.

Operating air compressor	\$858. 28
Electric power	5, 784. 48
Operating towboat <i>Coosa</i>	4, 838. 80
Operating launch <i>Etowah</i>	600. 96
Operating heating system	257. 07
Installing heaters in quarters	26. 93
Clearing channel at wharf	27. 30
Hauling supplies from Riverside	837. 15
Surveys and inspections	36. 55
Reservation	257. 50
Cleaning reservation	241. 60
Watching at Dam No. 5	1, 453. 46
Inspecting boilers	38. 68
Moving boilers	467. 01
Raising cable	85. 17
Superintendence and contingencies	4, 346. 62
Miscellaneous	2, 229. 12
	\$22, 386. 68
Lumber, subsistence supplies, pipe fittings, etc., on hand at close of fiscal year	3, 513. 91
Total	77, 269. 53

Summary of expenditures.

Outstanding liabilities from previous year	\$16, 577. 58
Work at Dam No. 5	\$77, 269. 53
Less outstanding liabilities at close of fiscal year	10, 307. 97
	66, 961. 56
Actual expenditures during the year	83, 539. 14

APPROPRIATIONS.

Present project:

Between Rome, Ga., and East Tennessee, Virginia & Georgia

R. R. bridge—¹

Aug. 14, 1876	\$30, 000. 00
June 18, 1878	75, 000. 00
Mar. 3, 1879	45, 000. 00
June 14, 1880	75, 000. 00
Mar. 3, 1881	60, 000. 00
Aug. 2, 1882	83, 700. 00
July 5, 1884	50, 000. 00
Aug. 5, 1886	45, 000. 00
Aug. 11, 1888	60, 000. 00
Sept. 19, 1890	150, 000. 00
July 13, 1892	130, 000. 00
Aug. 18, 1894	110, 000. 00
June 3, 1896	50, 000. 00
Mar. 3, 1899	20, 000. 00
June 13, 1902	27, 844. 20
June 13, 1902 (transferred from appropriation for section between Wetumpka and East Tennessee, Virginia & Georgia R. R. bridge)	10, 000. 00
June 13, 1902 (allotment May 31, 1904)	7, 500. 00
Mar. 3, 1905	25, 000. 00
Mar. 2, 1907	48, 000. 00

¹ Formerly known as the Selma, Rome & Dalton R. R. bridge.² Includes \$8,700 transferred from appropriation for Etowah River, Ga.³ Part of an appropriation of \$35,000 for Coosa, Oostenaulla, and Coosawattee Rivers. The act also directed the transfer, from the balance to the credit of the improvement below the railroad bridge, of \$10,000 for expenditure above said bridge.

Present project—Continued.

Between Rome, Ga., and East Tennessee, Virginia & Georgia

R. R. bridge—Continued.

Mar. 3, 1909 (allotment Apr. 9, 1909)-----	¹ \$38,000.00
June 25, 1910-----	247,500.00
Feb. 27, 1911-----	271,089.00
July 25, 1912-----	144,000.00
Mar. 4, 1913-----	136,000.00
Oct. 2, 1914 (allotment Oct. 7, 1914)-----	40,000.00
Mar. 4, 1915 (allotment Apr. 2, 1915)-----	106,000.00
Mar. 4, 1915 (allotment Sept. 23, 1915)-----	80,000.00
Mar. 4, 1915 (allotment May 18, 1916)-----	80,000.00
July 27, 1916-----	98,000.00
	<hr/> \$2,842,583.20

Carried to surplus fund (1914) from act of Mar. 3, 1909----- 6,181.02

Net total----- 2,836,452.18

Receipts from sales----- 1,461.05

Grand total----- 2,237,913.23

Between Wetumpka, Ala., and East Tennessee, Virginia & Georgia R. R. bridge—¹

Sept. 19, 1890-----	\$150,000.00
July 13, 1892-----	100,000.00
Aug. 18, 1894-----	110,000.00
June 3, 1896-----	² 40,000.00
Mar. 2, 1907-----	³ 2,000.00
Mar. 3, 1909 (allotment Apr. 9, 1909)-----	⁴ 2,000.00
	<hr/> \$404,000.00

Receipts from sales----- 455.82

Net total----- 404,455.82

Grand net total----- 2,644,369.05

CONTRACTS IN FORCE.

Name and address of contractor: Alabama Power Co., Birmingham, Ala.

Work: Electrical energy at Dam No. 5, Coosa River, Ala.

Contract price: For capacity, \$1.25 per kilowatt per month; for energy, from 0.4 to 3 cents per kilowatt-hour, based on the number of kilowatt-hours per month.

Date of contract: August 21, 1915.

Date of approval: October 19, 1915.

Date of commencement: August 21, 1915.

Date of expiration: August 20, 1916.

Completed at end of fiscal year: About 70 per cent.

Name and address of contractor: Carolina Portland Cement Co., Charleston, S. C.

Work: Furnishing approximately 20,000 barrels of American Portland cement.

Contract price: \$1.49 per barrel.

Date of contract: October 3, 1914.

Date of approval: October 15, 1914.

Date of commencement: October 31, 1914.

Date of expiration: Based on progress of work at point of delivery.

Completed at end of fiscal year: About 65 per cent.

¹ Does not include \$2,000 transferred to section between Wetumpka and East Tennessee, Virginia & Georgia R. R. bridge.² Appropriation of \$50,000, of which \$10,000 was transferred by act of June 13, 1902, to section between Rome, Ga., and East Tennessee, Virginia and Georgia R. R. bridge.³ Transferred from section between Rome, Ga., and East Tennessee, Virginia & Georgia R. R. bridge.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Class.	Ameri- can.	Net registered tonnage.	Passen- gers.
Registered:			
Steamers.....	3	372	2,240
Gasoline launches.....	2	16	.....
Gasoline towboats.....	1	123	.....
Unregistered:			
Dredges.....	2	400	.....
Barges.....	15	1,379	.....
Rafts.....	68	.....	.....
Total.....	91	2,290	2,240

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was car- ried.	Rate per ton-mile.
UPSTREAM.				Miles.	
Brick.....	40,000.....	106	\$290	80	\$0.02
Cement.....	540 sacks.....	27	270	80	.04
Coal.....	50 tons.....	50	250	80	.033
Cotton.....	2,900 bales.....	725	174,000	80	.0267
Cotton seed.....	4,800 sacks.....	240	9,600	80	.0167
Fertilizer.....	7,000 sacks.....	700	14,000	80	.0267
Fruit.....	4,000 crates.....	200	10,000	80	.04
Grain.....	6,700 sacks.....	503	16,750	80	.033
Hay and feed.....	3,840 bales.....	192	3,840	80	.033
Heading timber.....	1,179 cords.....	1,768	3,537	12	(1)
Live stock.....	38 head.....	19	3,500	80	.04
Lumber.....	400,000 feet.....	800	8,000	80	.04
Manufactured iron and steel.....	1,300 packages.....	65	5,850	80	.04
Miscellaneous merchandise.....	29,000 packages.....	2,900	406,000	80	.03
Oil.....	12,500 gallons.....	50	2,500	80	.04
Resin.....	765 barrels.....	191	3,825	10	.02
Salt.....	1,200 sacks.....	120	1,200	80	.033
Sand and gravel.....	4,445 yards.....	6,000	3,900	7	(1)
Shingles.....	9,000.....	2	36	80	.04
Stone.....	10 tons.....	10	50	80	.02
Sugar.....	170 barrels.....	33	5,304	80	.04
Ties, cross.....	380.....	34	190	80	.04
Turpentine.....	219 barrels.....	40	5,475	10	.02
Total.....		14,777	678,387		
DOWNSTREAM.					
Brick.....	8,000.....	22	56	80	.02
Cement.....	50,264 sacks.....	2,513	25,132	44	.025
Coal.....	1,576 tons.....	1,576	4,728	36	.0175
Cotton.....	1,181 bales.....	297	71,340	80	.0267
Cotton seed.....	860 sacks.....	43	1,720	80	.0167
Fertilizer.....	11,000 sacks.....	1,100	22,000	80	.0267
Fruit.....	540 crates.....	27	1,350	80	.04
Grain.....	9,800 sacks.....	735	24,500	80	.0267
Hay and feed.....	6,750 bales.....	338	6,750	80	.0267
Heading timber.....	2,358 cords.....	3,537	7,074	40	(1)
Live stock.....	92 head.....	30	4,600	80	.04
Logs:					
Gum.....	8,752 feet.....	9	88	60	(2)
Pine.....	323,050 feet.....	646	2,584	60	(2)
Lumber.....	297,500 feet.....	595	5,950	80	.01
Manufactured iron and steel.....	20,694 packages.....	1,035	82,800	80	.025
Miscellaneous merchandise.....	68,756 packages.....	6,875	962,500	80	.03
Oil.....	14,235 gallons.....	57	2,847	44	.08
Salt.....	2,806 sacks.....	280	2,806	80	.0267

¹ Rafted.² Barged.

Freight traffic—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
DOWNSTREAM—continued.					
Sand and gravel.....	8,126 yards.....	10,970	\$7,130	Miles. 7	(1)
Sugar.....	709 barrels.....	138	22,120	80	\$0.0267
Ties, cross.....	38,610.....	3,474	19,305	15	(9)
Total.....		34,297	1,277,380		
RECAPITULATION.					
Freight traffic:					
Upstream.....		14,777	678,357		
Downstream.....		34,297	1,277,380		
Total.....		49,074	1,955,737		
Increase over last year.....		20,323	437,759		

¹ Barged.² Rafted.

Number of ton-miles of freight transported:

Upstream.....	607,766
Downstream.....	1,400,696
Total.....	2,008,462
Expenditure for the year on this improvement.....	\$168,017.64
Expenditure per ton-mile of freight transported.....	\$0.0837

17. OPERATING AND CARE OF LOCKS AND DAMS ON COOSA RIVER, GA. AND ALA.

During the fiscal year ending June 30, 1916, Locks Nos. 1, 2, 3, and lock at Mayos Bar were operated without interruption. Lock No. 4 was operated when there was sufficient depth over the lower sill for the passage of boats. Upon the completion of Dam No. 5 there will be 6-foot navigation through this lock at all times. Actual expenditures during the fiscal year, exclusive of outstanding liabilities, were as follows:

MAYOS BAR.

Repairs to dam.....	\$4,099.98
Sloping bank of river below abutment and placing riprap protection on same.....	6,774.47
Sloping bank above the lock.....	1,100.00
Repairs to valves and operating machinery.....	125.06
Lock master's salary.....	825.00
Lockman's salary.....	524.00
Minor repairs to lock house.....	575.20
	\$14,023.71

LOCK NO. 1.

Lock master's salary.....	650.00
Renewal of gates.....	354.41
Repairs to lock house.....	6.29
	1,010.70

LOCK NO. 2.

Lock master's salary.....	650.00
Operation and supplies for water-supply system.....	4.62
Repairs to lock house.....	.77
Repairs to lock gates.....	245.23
	900.62

LOCK NO. 3.

Lock master's salary	\$650.00
Repairs to lock house	4.57
Construction of storehouse	205.05
	\$859.62

LOCK NO. 4.

Lock master's salary	825.00
Lockman's salary	652.00
Lockman's salary	550.00
Minor repairs to lock house	50.00
Operating and care of water system	80.00
Contingencies	156.41
	2,313.41
Total	19,108.06

At Mayos Bar the dam was repaired; the banks above and below the lock were sloped and revetted with stone; some preliminary work toward repairing the filling and emptying valves was done, and minor repairs made to the lock house. At Lock No. 1 some preliminary work toward the installation of the steel gates was done, and minor repairs made to the lock house. At Lock No. 2 minor repairs to the gates and lock house were made. At Lock No. 3 minor repairs to the lock house were made and some preliminary work done toward the erection of a storehouse. At Lock No. 4 minor repairs to the lock house were made. All work was done by hired labor with Government plant.

Summary of expenditures made during the fiscal year at Locks Nos. 1, 2, 3, and 4 and at Mayos Bar Lock and Dam.

Outstanding liabilities from previous year	\$2,192.34
Services	\$12,723.08
Material	2,770.53
Subsistence	1,967.68
Travel	25.13
Contracts outstanding	3,313.76
Services other than personal	145.44
Total	20,945.62
Less outstanding liabilities, June 30, 1916	4,029.90
	16,915.72
Actual expenditures during the fiscal year	19,108.06

EXPENDITURES.¹

Fiscal year ending June 30—		Fiscal year ending June 30—	
1890	\$328.42	1905	\$8,442.57
1891	2,530.67	1906	9,016.35
1892	6,137.49	1907	11,444.11
1893	9,366.56	1908	16,037.14
1894	3,418.53	1909	5,218.84
1895	3,982.66	1910	6,064.20
1896	8,797.12	1911	3,777.92
1897	6,137.92	1912	5,919.78
1898	2,281.98	1913	3,258.82
1899	7,141.60	1914	4,700.52
1900	5,907.16	1915	16,634.73
1901	8,510.75	1916	19,108.06
1902	42,106.40		
1903	22,638.72	Total	244,479.83
1904	5,572.81		

¹ Under permanent indefinite appropriation provided by acts of July 5, 1884, and March 3, 1909, for operating and keeping in repair canals and other public works.

CONTRACTS IN FORCE.

Name and address of contractor: The Whitehead & Kales Iron Works, Detroit, Mich.

Work: Furnishing two pairs of steel mitering gates for Lock No. 1, Coosa River, Ala.

Contract price: \$3,313.76.

Date of contract: November 29, 1915.

Date of approval: December 16, 1915.

Date of commencement: January 3 1916.

Date of expiration: March 20, 1916. (Time limit waived.)

Completed at end of fiscal year: About 50 per cent.

COMMERCIAL STATISTICS.

Commerce passing through the locks—Coosa River, Ga. and Ala., during the calendar year 1915.

Locks.	Usual limit draft for loaded boats.	Number of lockages.		Up (short tons).				Down (short tons).			Total (short tons).	Value.
		Up.	Down.	Coal.	Lumber.	Miscellaneous merchandise.	Sand.	Coal.	Lumber.	Miscellaneous merchandise.		
	<i>Feet.</i>											
Mayos Bar..	4	111	108	20	270	2,507	830	52	.....	2,950	6,629	\$766,230
Lock No. 1..	3	54	48	.....	149	.....	.....	.....	19	.....	168	840
Lock No. 2..	4	94	113	.....	.....	.....	.....	12	348	.....	360	1,800
Lock No. 3..	3	13	18	.....	.....	.....	.....	.....	30	.....	30	150
Lock No. 4..	6	158	158	.....	.....	.....	.....	.....	40	.....	40	200
Total...	.....	430	440	20	419	2,507	830	64	437	2,950	7,227	766,230

IMPROVEMENT OF RIVERS AND HARBORS IN THE MOBILE, ALA., DISTRICT.

REPORT OF MAJ. EDWARD H. SCHULZ, CORPS OF ENGINEERS.

IMPROVEMENTS.

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1. Mobile Harbor, Ala.....	2377	8. Pascagoula Harbor, Miss.....	2398
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3. Black Warrior, Warrior, and Tombigbee Rivers, Ala.....	2382	10. Biloxi Harbor, Miss.....	2402
4. Tombigbee River, Ala., from mouth to Demopolis (main- tenance of channel).....	2385	11. Gulfport Harbor and Ship Is- land Pass, Miss.....	2403
5. Tombigbee River, from De- mopolis, Ala., to Walkers Bridge, Miss.....	2388	12. Wolf and Jordan Rivers, Miss..	2405
6. Operating and care of locks and dams on Black Warrior and Tombigbee Rivers, Ala.....	2390	13. East Pearl River, Miss.....	2406
7. Channel between Mobile Bay and Mississippi Sound, Ala.	2398	14. Pearl River, below Rockport, Miss.....	2406
		15. Removal of water hyacinths (East Pearl River, Miss.)....	2408

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 801 TO 850.

1. MOBILE HARBOR, ALA.

The U. S. dredge *Wahalak* was engaged in maintaining that portion of the improvement in Mobile Bay during the following periods: July 1 to 26, August 27 to September 30, and October 6 to November 3, 1915; and November 8, 1915, to March 20, 1916. In that time the dredge worked over the channel from 300 feet north of day mark 6 to 6,820 feet south of beacon 8C, and from 1,600 feet south of beacon 8A to beacon 4, with the following results:

Material removed from the theoretical section.....	cubic yards.....	4,687,668.2
Total material removed.....	do.....	5,120,280.9
Total cost of dredging, including surveys, office expenses, etc.....		\$83,351.51
Gross cost per cubic yard for material removed from within the theoretical section.....		\$0.0179
Gross cost per cubic yard for all material removed.....		\$0.0163
Length of channel dredged over.....	feet.....	115,217
Average bottom width of channel formed.....	do.....	223.7
Average depth of cut made.....	do.....	31.4

The U. S. snag boat *Demopolis* was engaged in the removal of sunken obstructions during 71 days of the year, in the period from August 11 to November 24, 1915. The remainder of the time she was

engaged on general improvement work. In connection with the removal of obstructions she accomplished the following:

Snags removed	646
Logs removed	42
Square timber removed	80

The work resulted in clearing 10,500 linear feet of the improved channel in Mobile River, which is about 5 miles long. Expenditures were as follows:

Removing obstructions	\$3, 448. 79
Handling heavy parts of dredges and miscellaneous plant at the United States reservation, Mobile, Ala.	708. 09

Miscellaneous expenditures, as shown below, were also made:

Construction of marine ways at Pascagoula, Miss.	\$1, 805. 82
Part cost of purchase and installation of plant at United States shipyard at Pascagoula, Miss.	673. 47
Carling for property at Pascagoula, Miss., and Mobile, Ala.	1, 498. 37
Operation of two automatic tide gauges in Mobile Bay and compiling records of same	1, 225. 00
Part cost of inspection and miscellaneous work, of U. S. S. <i>Chickasaw</i> and U. S. launch <i>Dauphin</i>	4, 223. 52
Part cost of upkeep and repair of plant previously used on the work and plant laid up on account of lack of funds.	3, 211. 12

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 498)

\$5, 618, 630. 60

Present project:

June 25, 1910	\$455, 000. 00
Feb. 27, 1911	505, 000. 00
July 25, 1912	403, 000. 00
Mar. 4, 1913	255, 000. 00
Mar. 4, 1913 (emergency allotment Aug. 1, 1914)	19, 864. 29
Oct. 2, 1914	62, 500. 00
Mar. 4, 1915	107, 000. 00
Mar. 4, 1915 (allotted Feb. 28, 1916)	20, 000. 00
July 27, 1916	155, 000. 00
	<hr/>
	1, 952, 364. 29

Total of appropriations

7, 570, 994. 89

Receipts from sales

1, 952. 17

Received for rent of U. S. dredge *Charleston*

902. 43

Total

7, 573, 849. 49

CONTRACTS IN FORCE.

With the Gulf States Coal Co.,¹ dated March 15, 1915, approved by the Chief of Engineers March 30, 1915, for delivery of about 7,000 short tons of bituminous coal at a unit price of \$1.38 in carload lots, and the furnishing of 3,500,000 gallons of fresh water for drinking and steaming purposes at a unit price of 8 cents per 1,000 gallons. Work under this contract commenced on April 5, 1915; contract completed March 28, 1916. Under this contract coal is received at the mines and shipped to destination over land-grant railroads.

¹ Allotment of \$10,000, of which \$185.71 was returned to Treasury.

² The amount of coal and water stated above to be furnished under this contract includes coal and water for boats working on Mobile Bar. This contract also provides for furnishing coal and water for boats engaged on other harbor work.

COMMERCIAL STATISTICS.

Vessel classification.

Classes.	Entrances and clearances.			Net registered tonnage.	Passengers.
	American.	Foreign.	Total.		
Registered and unregistered:					
Steamers.....	15,794	639	6,353	2,037,557	126,066
Sailing vessels.....	285	285	570	392,285	.....
Small craft.....	6,432	.....	6,432	278,786	14,144
Total.....	12,441	914	13,355	2,708,628	140,210

¹ Includes river and bay steamers and tugs.

² Includes launches, barges, etc.

Of the above, 689 steamers of 757,628 net registered tonnage and 556 sailing vessels of 373,399 net registered tonnage were engaged in foreign and coastwise commerce.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
FOREIGN EXPORTS AND IMPORTS.			
Ammonia sulphate.....	226 tons.....	226	\$10,754
Asphalt.....	1,847 tons.....	1,847	13,326
Bananas.....	2,397,093 bunches.....	71,912	702,093
Brick, fire.....	70,400.....	176	2,688
Coal, bunker.....	94,974 tons.....	94,974	266,133
Cocoanuts.....	1,869,750.....	1,402	26,837
Coffee.....	503 sacks.....	33	7,978
Corn.....	560,771 sacks.....	39,254	1,123,085
Cotton.....	105,306 bales.....	37,590	3,654,949
Flour.....	419,014 barrels.....	41,063	2,548,010
Grapefruit.....	2,788 crates.....	139	2,376
Hog products.....	8,458 tons.....	8,458	1,808,846
Iron pyrites.....	28,362 tons.....	28,362	93,536
Logs.....	1,871,861 feet b. m.....	3,744	57,561
Lumber and timber.....	96,224,000 feet b. m.....	190,448	1,688,452
Manufactured steel and iron.....	13,876 tons.....	13,876	1,385,938
Molasses, crude.....	259,797 barrels.....	74,302	337,734
Naval stores.....	68,291 barrels.....	22,064	314,738
Pig iron.....	3,683 tons.....	3,683	47,478
Pineapples.....	246,066 cubic feet.....	3,976	205,067
Sisal grass.....	12,908 tons.....	12,908	838,789
Sodium nitrate.....	2,089 tons.....	2,089	54,574
Staves.....	3,058,701.....	41,488	445,153
Miscellaneous.....	56,730 tons.....	56,730	5,973,602
Total.....	.....	739,825	21,694,739
COASTWISE AND DOMESTIC SHIPMENTS AND RECEIPTS.			
Asphalt.....	199 tons.....	199	4,179
Automobiles.....	192.....	339	108,980
Bagging.....	28,169 rolls.....	1,406	140,845
Brick.....	1,254,734.....	3,187	7,894
Cement.....	51,935 sacks.....	5,597	33,758
Coal.....	91,384 tons.....	91,384	268,509
Coffee.....	3,254 sacks.....	212	50,732
Corn meal.....	131,825 sacks.....	3,601	221,466
Cotton and by-products.....	17,845 tons.....	17,845	2,363,069
Cotton ties.....	7,640 bundles.....	176	13,720
Croasties.....	1,005,020.....	77,899	500,184
Feed.....	179,028 sacks.....	11,001	205,727
Fertilizer.....	58,516 sacks.....	5,882	175,651
Fish and oysters.....	221,447 barrels.....	22,145	582,211
Flour.....	100,048 barrels.....	9,906	698,296
General merchandise.....	50,570 tons.....	50,570	3,796,607
Grease and wax.....	126 tons.....	126	19,986
Hay and grain.....	40,430 tons.....	40,430	1,222,985
Hides and skins.....	1,633 packages.....	154	30,858
Hog products.....	780 tons.....	780	232,387
Live stock.....	4,173 head.....	1,460	233,698
Logs.....	40,071,251 feet b. m.....	80,141	452,065
Lumber and timber.....	42,897,386 feet b. m.....	85,775	846,046

Freight traffic—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.
COASTWISE AND DOMESTIC SHIPPING AND RECEIPTS—continued.			
Manufactured goods.....	7,834 tons.....	7,834	\$783,400
Manufactured steel and iron.....	55,636 tons.....	55,636	6,221,610
Naval stores.....	202,617 barrels.....	49,888	1,731,073
Oils, refined and crude.....	227,448 barrels.....	26,820	1,337,749
Salt.....	97,274 sacks.....	9,727	194,548
Sand and gravel.....	41,542 tons.....	41,542	33,588
Shingles.....	537,026 bundles.....	26,851	537,026
Shooks.....	81,936 bundles.....	2,663	40,968
Staves.....	5,298,631.....	66,233	741,808
Stones.....	10,374 cubic yards.....	21,008	25,672
Sugar.....	7,802 barrels.....	1,366	214,244
Veneers.....	2,459 tons.....	2,459	92,920
Wool.....	571 bales.....	71	44,555
Miscellaneous.....	21,334 tons.....	21,334	488,058
Total.....		840,479	24,846,032
Total foreign exports and imports.....		789,325	21,594,739
Total coastwise and domestic shipments and receipts.....		840,479	24,846,032
Total commerce during calendar year 1915.....		1,579,804	46,440,771

The total customs receipts from all sources during the calendar year 1915 amounted to \$98,887.91.

Comparative statement of the number and draft of vessels passing up and down the dredged channel for the calendar years ending Dec. 31, 1914 and 1915.

[Compiled from the books of the harbor master at Mobile, Ala.]

Draft.	Steamships.				Schooners.			
	Up.		Down.		Up.		Down.	
	1914	1915	1914	1915	1914	1915	1914	1915
Less than 13 feet.....	364	215	224	150	149	132	59	66
13 to 14 feet.....	115	94	84	63	1	2	11	28
14 to 15 feet.....	63	50	48	41	1	4	53	14
15 to 16 feet.....	67	31	64	24	1	5	16	22
16 to 17 feet.....	12	54	80	11		1	16	9
17 to 18 feet.....	26	14	29	29		1	8	3
18 to 19 feet.....	17	6	37	53	2	1	7	1
19 to 20 feet.....	6	8	27	68	1		3	
20 to 21 feet.....	8	4	25	19	1		6	1
21 to 22 feet.....	10	4	29	18	1	2		3
22 to 23 feet.....	8	5	26	8			2	1
23 to 24 feet.....	5	10	12	7				
24 to 25 feet.....	3	1	10					
25 to 26 feet.....	3	4	7	6				
26 to 27 feet.....	1	2	4	2				
27 to 28 feet.....				3				
Total.....	708	502	706	502	157	148	186	148

Comparative statement of the number and draft of vessels passing up and down the dredged channel, etc.—Continued.

Draft.	Square-rigged vessels.				Total.			
	Up.		Down.		Up.		Down.	
	1914	1915	1914	1915	1914	1915	1914	1915
Less than 13 feet.....	29	39	6	11	542	386	289	227
13 to 14 feet.....	5	9	2	1	121	105	97	92
14 to 15 feet.....	1	4	1	1	65	58	82	56
15 to 16 feet.....		3			68	39	80	46
16 to 17 feet.....		1	3	3	12	56	99	23
17 to 18 feet.....			5	5	26	15	37	37
18 to 19 feet.....			3	4	19	7	47	58
19 to 20 feet.....			6	6	7	8	36	74
20 to 21 feet.....		2	2	9	9	6	33	29
21 to 22 feet.....			7	9	11	6	36	30
22 to 23 feet.....				7	8	5	28	16
23 to 24 feet.....				1	5	10	12	8
24 to 25 feet.....				1	3	1	10	1
25 to 26 feet.....					3	4	7	6
26 to 27 feet.....					1	2	4	2
27 to 28 feet.....								3
Total.....	35	58	35	58	900	708	897	708

2. MOBILE BAR, ALA.

No dredging was done at this locality during the fiscal year.

An attempt was made to remove the wreck and cargo, consisting principally of railroad iron, of the ship *Indian Chief* that sunk on this bar about 44 years ago. This wreck lies along the prolongation of the dredged channel, near its inner end, and between it and Sand Island Light. From November 26, 1915, to January 29, 1916, an effort was made to remove the wreck, but due to weather conditions work was discontinued, as only a small portion had been removed. This work was recommenced on June 26, 1916, and continued during the rest of the month. During the fiscal year 35 tons of railroad iron were removed, and the expenditures on this work amounted to \$2,295.77.

In addition to the amount expended on the above work, expenditures for other purposes were made as follows:

Part cost of upkeep and repair of plant previously used on the work.....	\$4,315.62
Office expense in connection therewith.....	394.22
Freight on coal used in previous fiscal year's dredging.....	46.66

The U. S. dredge *Charleston* was temporarily transferred to the Montgomery, Ala., district during the year and left Mobile on January 7, 1916, for St. Andrews Bay, Fla., where she now is.

APPROPRIATIONS.

June 13, 1902.....	\$50,000.00	Mar. 4, 1913.....	\$20,000.00
Mar. 3, 1905.....	50,000.00	Oct. 2, 1914.....	10,000.00
Mar. 2, 1907.....	50,000.00	Mar. 4, 1915.....	10,000.00
Mar. 3, 1909.....	23,000.00	July 27, 1916.....	20,000.00
June 25, 1910.....	9,000.00		
Feb. 27, 1911.....	5,000.00	Total.....	273,100.00
July 25, 1912.....	10,000.00	Receipts from sales.....	4.55
Mar. 3, 1909 (allotted Dec. 8, 1912).....	16,100.00	Grand total.....	273,104.55

COMMERCIAL STATISTICS.

[Calendar year ending Dec. 31, 1915.]

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Ammonia sulphate.....	226 tons.....	226	\$10,754
Asphalt.....	1,535 tons.....	1,535	17,276
Bananas.....	2,397,093 bunches.....	71,913	702,093
Brick.....	91,080.....	228	2,838
Coal.....	97,182 tons.....	97,182	270,798
Cocoanuts.....	1,598,750.....	1,403	35,857
Coffee.....	553 sacks.....	33	7,978
Cotton and by-products.....	30,286 tons.....	30,286	4,293,899
Cross-ties.....	649,512.....	50,360	823,208
Fertilizer.....	2,119 sacks.....	212	5,560
Fish.....	7,760 barrels.....	776	108,900
Flour.....	429,374 barrels.....	41,197	2,555,490
General merchandise.....	37,143 tons.....	37,143	2,875,899
Grapefruit.....	2,788 crates.....	139	2,376
Grease and wax.....	126 tons.....	126	19,996
Hay and grain.....	48,898 tons.....	48,898	1,419,536
Hog products.....	5,480 tons.....	5,480	1,682,248
Iron pyrites.....	28,362 tons.....	28,362	93,836
Logs.....	1,371,881 feet b. m.....	3,743	57,561
Lumber and timber.....	121,523,186 feet b. m.....	243,045	2,313,243
Manufactured steel and iron.....	16,259 tons.....	16,259	1,592,776
Molasses, crude.....	255,797 barrels.....	74,302	837,734
Naval stores.....	209,663 barrels.....	52,102	1,247,253
Oils, refined and crude.....	200,113 barrels.....	22,613	1,110,448
Pig iron.....	3,683 tons.....	3,683	47,478
Pineapples.....	246,006.....	3,076	205,057
Shingles.....	5,744 bundles.....	287	5,744
Shooks.....	81,936 bundles.....	2,643	40,968
Stial grass.....	12,908 tons.....	12,908	823,789
Sodium nitrate.....	2,089 tons.....	2,089	54,574
Staves.....	5,058,701.....	63,234	725,153
Sugar.....	3,477 barrels.....	606	108,282
Wool.....	103 bales.....	13	3,005
Miscellaneous.....	57,163 tons.....	57,163	5,906,878
Total.....		976,286	29,154,704

3. BLACK WARRIOR, WARRIOR, AND TOMBIGBEE RIVERS, ALA.

Lock and dam construction.—The following minor details were completed by hired labor at Lock No. 17, which is 388 miles above Mobile: Gate maneuvering gears were completed, including platforms for use in case it should be necessary to operate gates by hand power; fuel and water tanks for use with oil engine were delivered and fitted up, and water tank erected for use of lock employees; cableway was erected for emergency use in placing coffer timbers and needles across upper end of lock in case of accident; and machinery and plant which had been used to erect lock gates were returned to Tuscaloosa shops and stored.

Work on maps, abstracts, descriptions, and deeds for land submerged by backwater from Dam No. 17, and negotiations with owners of same have been continued. Agreements have been reached with 78 owners for about 2,530 acres of land, involving about \$110,000, or at an average price of about \$43.50 per acre. Two tracts of about 50 acres each have been condemned, but as the award made by commissioners in each case was considered excessive both cases were appealed and have been set for future dates to be tried by jury.

All material has been purchased and delivered for two steel work barges, each 24 feet by 100 feet by 7 feet; all construction work has been completed by hired labor at United States shops, and one of them is now being erected on launching ways near Lock 12. Some

repairs have been made to U. S. S. *Nugent* and to derrick boat *Tallahatta*.

Reconnaissance has been made of the head waters of the Mulberry, Sipsey, and Locust Forks with a view to further surveys. The expenditures during the fiscal year for the above work, all of which was charged to Lock No. 17, was \$44,912.23.

At Lock and Dam No. 2, 182 miles above Mobile, the following work was accomplished with United States plant and hired labor:

Items.	Quantities.	Character of work.
Concrete.....	95.81 cubic yards.....	Placed in foundation of storehouse.
Stone fill.....	2,854.73 tons.....	Placed on and below apron of dam.
Framed timber, square edge and sound	31,211 feet b. m.....	Placed in storehouse.
Coal.....	441.3 tons.....	Received and stored for next season's work.
Stone.....	1,668.10 tons.....	Do.

The total expenditure was \$22,737.06.

At Lock and Dam No. 3, 205 miles from Mobile, the following work was accomplished with United States plant and hired labor:

Items.	Quantities.	Character of work.
Excavation.....	728 cubic yards.....	Grading for placing riprap.
Concrete.....	35.71 cubic yards.....	Placed in foundation of storehouse.
Riprap.....	413 cubic yards.....	Bank protection below abutment.
Stone fill.....	1,117 tons.....	Placed on and below apron of dam.
Coal.....	470.47 tons.....	Received and stored for next season's work.

The total expenditure during the fiscal year was \$10,150.44.

All work has been completed at Locks and Dams Nos. 2 and 3, except the placing of a small amount of rock to prevent erosion, which was not contemplated in the original designs.

The total expenditure during the fiscal year for all lock and dam construction amounted to \$77,799.73.

Dredging.—The U. S. dredge *Chas. Humphreys* and hired labor were employed about three months on original dredging on the section of river between Tuscaloosa and Demopolis, removing 75,284 cubic yards of material from the 13 localities in the following table, at a total cost of \$11,126.32, or about 15 cents per cubic yard:

Location.	Miles above Mobile.	Length of cut (feet).	Character of material.	Excavation (cubic yards).
Bar above County Bridge.....	361.7	375	Sand and gravel...	1,232
Tuscaloosa Wharf.....	361.5	500	do.....	3,235
Little Log Shoals.....	336.0	1,000	do.....	6,989
Trussels Bar.....	334.5	600	do.....	5,872
Guy Fosters Bar.....	332.0	250	do.....	2,045
Eddins cut-off.....	318.0	250	do.....	2,893
Battles Gin Bar.....	314.0	1,000	do.....	9,841
Bar below McGifferts.....	312.0	850	do.....	9,445
Mays Bar.....	310.5	700	do.....	9,107
Whites Island.....	308.5	250	do.....	2,888
Cleveland Shoals.....	307.5	650	do.....	5,779
Alligator Bar.....	305.0	600	do.....	9,473
Morrore Rock.....	302.5	550	do.....	6,485
Total.....				75,284

¹ Reimbursed by city of Tuscaloosa.

The following work was done on the Tombigbee River below Demopolis with United States plant and hired labor:

Location.	Miles above Mobile.	Length of cut (feet).	Character of material.	Excavation (cubic yards).
Boltons Bar.....	230	900	Sand and gravel...	10,797
Indian Queen Bar.....	217	350	do.....	2,000
Lock No. 3, lower approach.....	205	800	do.....	2,892
Rainwater Bar.....	202	950	do.....	983
Do.....	202	950	Hard clay.....	4,326
Four Mile Bar.....	196	700	Sand and gravel...	6,536
Lock No. 2, lower approach.....	182	425	Mud.....	2,380
Pearsons Shoal.....	176	10	Soft rock.....	90
Pickens Bar.....	160	850	Sand and gravel...	7,066
Singletons Bar.....	96	750	do.....	8,495
Harolds Bar.....	83	750	do.....	3,120
Total.....				45,686

The expenditure for the above was \$23,822.80 and includes the installation of a steam drilling plant on barge *No. 18* and the purchase of a steam drill and other necessary equipment for the drilling and blasting at Pearsons Shoal. Only 60 cubic yards were removed from channel at that location when the work had to be discontinued on account of early high water. From November 17, 1915, to June 20, 1916, quarter boats, 10-inch hydraulic dredge, derrick boat, drill boat, barges, and attendant plant were repaired and cared for. Operations were resumed again at Pearsons Shoal on June 27, 1916, and the 10-inch hydraulic dredge placed in commission again on June 22, 1916, at Indian Queen Bar. The construction of the *Ulkamush*, a 6-horsepower towboat, operated by a four-cylinder, two-cycle, heavy-duty marine engine of semi-Diesel type, using crude oil, was completed, the total cost being \$7,353.81. The construction of the boat was begun during the preceding fiscal year.

In all 120,970 cubic yards of material were removed at a total cost of \$34,949.12, or 28.8 cents per cubic yard, which includes the drilling and blasting necessary at Rainwater Bar and Pearsons Shoal.

Snagging.—The U. S. snag boat *R. C. McCalla* was employed on this work about five months and worked over 158 miles of river from Demopolis to Lock No. 17, removing 14,675 snags, logs, overhanging trees, and other obstructions. The total cost of snagging (original) during the year ending June 30, 1916, including part of repairs to snag boat, was \$8,474.63.

Navigation and commerce.—The commerce over this waterway is described in detail in the report of operating and care of locks and dams on the Black Warrior, Warrior, and Tombigbee Rivers, Ala.

During the year this river has been used by four passenger and freight packet boats, at least one of which has at all times made regular trips; five self-propelling steel barges, four of which have usually made regular through trips handling coal; four towboats with fleets of barges used exclusively in coal business; two towboats with barges used exclusively in log business; and two towboats which have at various times handled coal, logs, staves, crossties, and during the summer months engaged in the excursion business.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 408) - ¹\$407, 388. 80

Present project:

July 5, 1884	\$50, 000. 00
Aug. 5, 1886	56, 250. 00
Aug. 11, 1888	100, 000. 00
Sept. 19, 1890	150, 000. 00
July 13, 1892	250, 000. 00
Aug. 18, 1894	87, 500. 00
June 8, 1896	60, 000. 00
Mar. 3, 1899	320, 000. 00
June 6, 1900	286, 824. 00
June 6, 1900 (allotted July 9, 1900)	² 8, 691. 24
Mar. 3, 1901	298, 676. 00
June 13, 1902	874, 000. 00
Mar. 3, 1903	200, 000. 00
Apr. 28, 1904	225, 000. 00
Mar. 3, 1905	100, 000. 00
Mar. 3, 1905	15, 000. 00
June 30, 1906	603, 466. 00
Mar. 3, 1907	350, 000. 00
Mar. 4, 1907	238, 000. 00
May 27, 1908	530, 000. 00
Mar. 4, 1909	1, 000, 000. 00
June 25, 1910	500, 000. 00
June 25, 1910	312, 000. 00
Feb. 27, 1911	100, 000. 00
Mar. 4, 1911	250, 000. 00
Aug. 24, 1912	465, 000. 00
Mar. 4, 1913	1, 338, 500. 00
June 23, 1918	485, 000. 00
Oct. 2, 1914	750, 000. 00
	<hr/> 9, 498, 907. 24
Total of appropriations	9, 901, 295. 54
Receipts from sales	³ 4, 055. 16
Receipts account of damage to dredge <i>Chas. Humphreys</i>	25. 00
	<hr/>
Total	9, 905, 375. 70

4. TOMBIGBEE RIVER, ALA., FROM MOUTH TO DEMOPOLIS (MAINTENANCE OF CHANNEL).

During the fiscal year the entire section, a distance of 185 miles, was worked over. The U. S. snag boats *Tombigbee* and *Vienna* were employed on this work, the latter also being employed under another appropriation. (See Tombigbee River from Demopolis, Ala., to Walkers Bridge, Miss.) The *Tombigbee* was employed on this section from July 1 to December 22, 1915, and the *Vienna* from September 21 to December 15, 1915, and from January 4 to January 20, 1916. Due to unfavorable river conditions both boats were laid up the remainder of the year, during which time they were overhauled and

¹ Includes all of appropriations of 1875, 1876, 1878, and 1879 for "Warrior and Tombigbee Rivers," and all of those of 1880, 1881, 1882, 1884, 1886, 1888, 1890, 1892, 1894, and 1896 for "Warrior River."

² Amount allotted July 9, 1900, from emergency act of June 6, 1900, was actually \$4,000, but the unexpended difference of \$308.76 was turned back into the Treasury.

³ Due to failure to credit a receipt from sales, amounting to .50 cents, the amount shown in Annual Report for 1915 was incorrect. Total sales to the end in June 30, 1915, should have been stated as \$4,080.66.

repaired at the United States shipyard, Pascagoula, Miss. The work accomplished was as follows:

Snagging operations.

Items.	Tombigbee.	Vienna.	Total.
Overhanging trees felled and cut up.....	54,120	70,987	125,067
Overhanging trees felled and pulled back.....	1,875	2,754	4,129
Overhanging trees trimmed.....		13	13
Logs cut up or stumps leveled on bank.....	3,445	2,517	5,962
Stumps removed from river.....	773	191	964
Snags removed from river.....	2,441	55	2,496
Logs removed from river.....	185		185
Bushes cut.....	1,000	17,675	18,675
Total.....	63,352	94,143	157,494
Total distance worked over.....miles..	185	10	195
Cost of snagging.....	\$17,044.23	\$4,515.87	\$21,560.20
Cost of repairs to barge.....		87.36	87.36
Cost of repairs to snag boats.....	1,784.78	2,778.23	4,563.01
Total amount of expenditures.....	18,829.11	7,381.46	26,210.57
Cost of removal per obstruction, exclusive of bushes, and repairs to snag boats, and repairs to barge.....	.273	.059	.155

Since the completion of the canalization, which includes the part of this section above Lock 1, for which see preceding report on Black Warrior, Warrior, and Tombigbee Rivers, Ala., the general condition is much improved, and, although the channel is narrow and tortuous in places, a 6-foot draft for all-year navigation obtains throughout this section. At the end of the fiscal year the channel was clear of all obstructions.

The total amount expended during the fiscal year, all of which was for maintenance, was \$26,210.57. All work was done with United States plant and hired labor. A depth of 6 feet at mean low water now exists throughout this section, due to completion of the canalization system, of which it is a part. This increased depth will be maintained in future at a somewhat increased expense.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., pp. 408-409), excluding \$50,000 each of the appropriations for June 13, 1892, Aug. 18, 1894, June 3, 1896, and Mar. 3, 1899—in all, \$200,000—used in work of lock and dam construction on Tombigbee River, and including \$5,332.95 of the appropriation of June 10, 1872, for Tombigbee River, Ala., and Miss., shown on page 408 of the same document..... \$249,542.48

Present project:

June 13, 1902.....	\$16,000.00
June 13, 1902 (allotted May 31, 1904).....	¹ 3,778.81
Mar. 3, 1905.....	15,000.00
Mar. 2, 1907.....	16,000.00
Mar. 3, 1909.....	10,000.00
June 25, 1910.....	13,000.00
Feb. 27, 1911.....	15,000.00
July 25, 1912.....	10,000.00

¹ The appropriation of June 13, 1902, was actually \$20,000, of which \$4,000 was diverted to improvement of the section of the river between Columbus and Walkers Bridge. The allotment of May 31, 1904, was actually \$4,000; the unexpended difference was turned back into the Treasury.

Present project—Continued.

Mar. 4, 1913.....	\$12,500.00
Oct. 2, 1914.....	9,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915).....	42,500.00
July 27, 1916.....	25,000.00
	<u>\$187,776.81</u>
Total appropriations.....	437,318.79
Receipts from sales.....	1,213.24
Total.....	<u>438,532.03</u>

COMMERCIAL STATISTICS.

Vessel classification during calendar year ending Dec. 31, 1915.

Classes.	Ameri- can.	Net registered tonnage.	Passen- gers.
Registered steamers.....	839	62,965	3,266
Unregistered:			
Barges.....	817	198,066	.....
Small craft.....	318	1,982	.....
Rafts.....	170	33,491	.....
Total.....	2,134	296,524	3,266

Traffic during calendar year ending Dec. 31, 1915.

Articles.	Short tons.	Value.	Ton-miles.
Cement.....	141	\$1,586	26,745
Coal.....	55,486	138,715	12,331,061
Coke.....	75	375	3,675
Corn.....	1,706	58,004	335,685
Cotton.....	1,879	450,980	367,544
Cotton bagging.....	29	3,161	5,631
Cotton seed.....	1,338	33,450	254,120
Cottonseed hulls.....	156	2,184	28,923
Cotton ties.....	89	7,120	18,283
Fertilizer.....	722	14,440	144,204
Flour.....	562	30,910	107,201
Hay.....	242	4,840	82,053
Hardware.....	336	33,600	66,496
Live stock.....	176	24,640	26,731
Manufactured steel and iron.....	1,098	109,800	229,380
Mixed feed.....	1,144	37,752	231,558
Molasses.....	25	1,640	3,949
Oats.....	965	30,535	204,448
Oil.....	448	16,578	67,904
Packing-house products.....	228	91,200	42,896
Produce.....	183	18,300	83,601
Pig iron.....	50	650	11,550
Sand and gravel.....	168	168	5,880
Stone.....	12,515	31,288	1,752,826
Sugar.....	239	23,900	47,681
Logs.....	50,485	151,455	9,297,093
Lumber.....	12,260	122,500	2,206,123
Staves.....	17,474	349,480	3,458,797
Croceries.....	9,643	67,501	1,820,505
General and miscellaneous.....	6,136	613,600	1,184,308
Total.....	176,008	2,470,830	34,354,873

All of the above commerce passed through Locks 1, 2, and 3, Tombigbee River, Ala.

The following commerce, for which it was impracticable to obtain vessel classification, originating below Lock No. 1 (except 28,000 tons pine logs handled between Locks 3 and 4), did not pass through locks, and is in addition to the above table:

Articles.	Tons.	Value.	Ton-miles.
Sand and gravel.....	41,542	\$41,542	2,492,529
Staves.....	400	8,000	8,000
Pine logs.....	34,180	76,805	659,800
Oak and hickory logs.....	2,580	9,675	180,800
Lumber.....	320	3,200	19,200
Crossties.....	600	4,200	36,000
General and miscellaneous.....	4,462	44,200	312,240
Total.....	84,084	589,722	3,699,469

5. TOMBIGBEE RIVER FROM DEMOPOLIS, ALA., TO WALKERS BRIDGE, MISS.

During the fiscal year, although limited by insufficient funds, snagging operations were carried on from Demopolis to Hillmans Island, a distance of 40 miles. The U. S. snag boat *Vienna* carried on work on this section from July 1 to September 20, 1915, and from December 16, 1915, to January 3, 1916. From September 21 to December 15, 1915, and from January 4 to January 20, 1916, this snag boat was employed under another appropriation. (See Tombigbee River, from mouth to Demopolis.) The remainder of the year was unfavorable for snagging operations due to high water. The work accomplished was as follows:

Snagging operations.

Overhanging trees felled and cut up.....	84,013
Overhanging trees felled and pulled back.....	4,549
Overhanging trees trimmed.....	4
Logs cut up or stumps leveled on bank.....	1,893
Logs removed from drift piles.....	10
Stumps removed from river.....	2,579
Snags removed from river.....	73
Logs removed from river.....	1
Bushes cut.....	23,450

Total..... 116,572

Total distance worked over (miles).....	40
Total amount of expenditure.....	\$6,543.81
Cost of removal per obstruction, exclusive of bushes.....	\$0.07

All expenditures were for maintenance. The work was carried on with United States plant and hired labor.

From Aberdeen to Walkers Bridge, 119 miles, navigation is impracticable except for rafting at the mean and high stages. From Aberdeen to Columbus, 50 miles, navigation is possible at high stages but dangerous on account of rapid fluctuation. From Columbus to Demopolis, 149 miles, navigation is comparatively safe for a draft of 5 feet for about 4 months each year at mean and high stages, but Pickensville, 114 miles above Demopolis, is usually the

upper limit of navigation for boats of any considerable size. During the fiscal year ending June 30, 1917, it is proposed to operate one United States snag boat and barge on this work for the removal of snags and other obstructions between Columbus and Demopolis.

APPROPRIATIONS.

DEMOPOLIS TO COLUMBUS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 409) — \$63,382.98

Present project:

Sept. 19, 1890	\$15,000.00
July 3, 1892	35,000.00
Aug. 18, 1894	50,000.00
June 3, 1896	50,000.00
Mar. 3, 1899	10,000.00
Mar. 3, 1905	10,000.00
Mar. 2, 1907	12,000.00
June 25, 1910	11,000.00
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	193,000.00
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	256,382.98

COLUMBUS TO WALKERS BRIDGE.

Present project:

June 10, 1872	4,687.05
June 18, 1878	12,000.00
Mar. 3, 1879	10,000.00
June 14, 1890	4,000.00
Mar. 3, 1881	1,000.00
Aug. 2, 1882	1,000.00
Aug. 11, 1888	4,000.00
Sept. 19, 1890	4,000.00
July 13, 1892	9,000.00
Aug. 18, 1894	5,000.00
June 3, 1896	9,000.00
Mar. 3, 1899	6,000.00
June 13, 1902	4,000.00
Mar. 3, 1905	2,000.00
Mar. 2, 1907	2,000.00
Mar. 3, 1909	3,000.00
June 25, 1910	10,000.00
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	90,667.05

DEMOPOLIS TO WALKERS BRIDGE.

Present project:

Feb. 27, 1911	5,000.00
July 25, 1912	8,000.00
Mar. 4, 1913	15,000.00
Oct. 2, 1914	9,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	6,300.00
July 27, 1916	10,000.00
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	53,300.00

Total appropriations	400,350.03
Receipts from sales	40.00
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Total	400,390.03

COMMERCIAL STATISTICS.

Traffic during calendar year ending Dec. 31, 1915.

Articles.	Short tons.	Value.	Ton-miles.
Cement.....	2	\$22.50	202
Coal.....	408	1,007.50	20,193
Corn.....	538	18,292.00	48,320
Cotton.....	362	94,080.00	65,608
Cotton seed.....	271	6,775.00	36,283
Cottonseed hulls.....	108	1,442.00	5,700
Flour.....	33	1,798.50	3,074
Fertilizer.....	37	740.00	2,883
Hay.....	112	2,240.00	7,713
Hardware.....	24	2,400.00	2,195
Live stock.....	18	2,520.00	718
Manufactured steel and iron.....	222	22,200.00	7,461
Mixed feed.....	96	3,168.00	7,898
Molasses.....	5	360.00	525
Oats.....	195	6,045.00	17,937
Oil.....	9	333.00	995
Packing-house products.....	6	2,400.00	515
Produce.....	2	200.00	167
Sugar.....	11	1,100.00	870
Logs.....	11,836	26,681.00	485,048
Lumber.....	62	620.00	7,786
Staves.....	5,680	112,600.00	399,147
Stave bolts.....	3,088	61,760.00	141,210
Crossties.....	499	3,498.00	15,988
Cordwood.....	8	6.00	525
Brick.....	2	7.50	178
Meal.....	61	4,233.00	5,414
General and miscellaneous.....	569	56,900.00	48,072
Total.....	24,234	433,374.60	1,341,494

In addition, the following commerce was also carried over this section of river, for which it was impracticable to obtain ton-miles:

Articles.	Short tons.	Value.
Logs, pine.....	6,400	\$14,400
Logs, oak.....	3,584	13,478
General and miscellaneous.....	5	500
Total.....	9,989	28,378

It was impossible to obtain vessel classification for this section of river.

6. OPERATING AND CARE OF LOCKS AND DAMS ON BLACK WARRIOR AND TOMBIGBEE RIVERS, ALA.

All locks included in the project of canalization for this river system, designated as Locks Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 17, are now in operation. Work during the past year was as follows:

Lock 1.—Several jams of logs and driftwood, which accumulated during high water, and 360 cubic yards of flood deposit were removed from upper approach and lock chamber, respectively; 170 tons of stone were placed below apron of dam to prevent scour; drift boom in upper approach was repaired, and new anchorage, consisting of 3 cluster piles (5 piles to each cluster), was provided; lock houses were painted and repaired; snubbing posts placed along upper and lower approaches; and corners of lock walls repaired.

Lock 2.—Two four-room wooden houses were built to accommodate regular laborers; 250 cubic yards of flood deposit removed from lock

chamber; lock houses were painted and repaired; telephone line repaired and maintained between Jackson, Ala., and Lock No. 2, a distance of 64 miles; snubbing posts placed along approaches to lock.

Lock 3.—Lock houses were painted and repaired; telephone line repaired and maintained between Locks 2 and 3, a distance of 21 miles; snubbing posts placed along approaches to lock; all machinery and property used to build Lock No. 2 was checked and stored; fuel-oil supply tanks for towboat *Ulkunush* were installed.

Lock 4.—About 400 cubic yards of flood deposit were removed from lock chamber and upper approach to same; bank slopes have been graded, fences repaired; and high telephone poles for river crossing have been repaired.

Lock 5.—About 2,000 cubic yards flood deposit have been removed from lock chamber and approaches; 644 tons of stone placed on bank; snubbing posts set in river bank along lock approaches; timber delivered for rebuilding guard cribs above low-water line; telephone line repaired, including new high cedar poles for river crossing.

Lock 6.—About 4,000 cubic yards of flood deposit dredged from lock chamber and approaches to same, 634 tons of derrick stone placed on apron of dam, 2 guard clusters of 8 heart-pine piles each driven above this lock, 1 cluster driven below lock and broken piles replaced in 2 other clusters, lock grounds graded, grass planted, concrete walks built, and fences repaired.

Lock 7.—About 20,000 cubic yards of flood deposit dredged from lock chamber and approaches to same, 416 tons of derrick stone placed on apron of dam, 4 new clusters of 8 heart-pine piles each driven along lower approach to lock, telephone line repaired and snubbing posts placed in bank along lock approaches.

Lock 8.—About 4,400 cubic yards of flood deposit dredged from lock chamber and approaches, 1,025 tons of stone placed on apron of dam, 2 clusters of guide piles driven below lock, snubbing posts placed in bank along lock approaches, road to lock and telephone line repaired.

Lock 9.—About 5,200 cubic yards of flood deposit dredged from lock and approaches, 1,216 tons of stone placed on apron of dam, 2 clusters of guide piles driven below lock, lock grounds graded, snubbing posts set in bank along lock approaches, gate and valve maneuvering gears repaired.

Locks 10, 11, and 12.—Steel gates at these locks were reinforced with additional braces, new oak miter posts were placed on gates, lamps and lamp-posts were fitted up on lock walls, sanitary closets were built, and fences repaired; 1,881 cubic yards of flood deposit were dredged from lower approach to Lock 12, guard cribs above Lock 10 were rebuilt above water line, using 15,000 feet b. m. heart-pine timber and 133 tons of stone, and lock-tender's house at Lock 10 painted.

Lock 13.—About 2,000 cubic yards of flood deposit, earth, and shale, and 75 cubic yards of rock removed from lock approaches, 1 guard crib rebuilt above water line by using 5,000 feet b. m. timber and 100 tons of stone, new oak miter posts placed on upper gates, lamps and lamp-posts placed on lock walls.

Lock 14.—About 15 cubic yards of loose rock were removed from lower approach, telephone line repaired.

Lock 15.—Bank slopes graded and protected with 391 tons of riprap; lock grounds improved.

Lock 16.—New fence built around lock side of reservation, area back of lock graded and planted with Bermuda grass, gate--maneuvering gear repaired.

Lock 17.—Lock grounds improved, gate--maneuvering gear repaired.

General.—The U. S. snag boat *R. C. McCalla* was employed on this work about three months, working over about 214 miles of river from Demopolis to Sanders Shoal, removing 5,177 snags and other obstructions at a total cost of \$4,421.23, which includes part of repairs to this boat. The U. S. dredge *Chas. Humphreys* was employed on this work about two and one-half months and the 8-inch dredge *No. 6*, together with derrick boat *Tallahatta*, was employed practically four months removing flood deposit from locks and approaches. The total flood deposit removed amounted to 102,665 cubic yards, at a total cost of \$20,620.42, which includes repairs to the dredges. The dredge *Chas. Humphreys*, snag boat *R. C. McCalla*, 8-inch dredge *No. 6*, and four work barges were hauled out on ways for extensive repairs. The steamer *Nugent*, towboat *Sylph*, launch *Mulberry*, quarter boat *D* and three work barges were hauled out for minor repairs. Barge *No. 8* was rebuilt and cabin added, making quarter boat *Q*. All steam boilers have been thoroughly repaired. All work of past year was carried on by Government plant and hired labor, and the same method will be employed during the next fiscal year.

Statement showing allotments and expenditures for operating and care of Locks 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 17, Black Warrior and Tombigbee Rivers, Ala., during the fiscal year ending June 30, 1916.

Items.	Allotted.	Expended.
Salaries of regular employees.....	\$39,000.00	\$37,431.06
Extra labor.....	3,000.00	1,406.46
Riprap bank protection.....	17,500.00	3,514.75
Stone filling below dams.....	7,500.00	6,937.03
Filling above dams.....	2,000.00	
Removing flood deposits from locks and approaches.....	6,700.00	20,620.42
Removing snags and obstructions.....	5,500.00	5,007.56
Painting and repairs to gates, valves, and ironwork.....	3,600.00	3,102.72
Painting and repairs to buildings.....	2,500.00	1,363.51
Building and repairing reservation fences.....	1,800.00	1,162.90
Building and repairing timber guard cribs.....	12,500.00	3,173.25
Rebuilding pile clusters.....	2,000.00	2,491.35
Repairs to floating plant.....	9,500.00	17,484.12
Improving lock grounds.....	2,000.00	3,412.63
Repairs to telephone lines.....	2,000.00	2,957.54
Telephone service and maintenance.....	2,950.00	2,535.64
One lock tender's house and three tool houses.....	3,600.00	
Tools and plant.....	3,300.00	4,607.22
Fuel, lights, and oil.....	2,900.00	1,888.25
Incidentals.....	5,500.00	6,580.19
Outstanding liabilities.....	11,935.10	11,935.10
Total.....	187,285.10	136,911.70
Balance unexpended July 1, 1915.....		\$59,285.10
Amount allotted during fiscal year.....		88,000.00
Total amount available during past fiscal year.....		147,285.10
Amount expended during past fiscal year.....	\$136,911.70	
Outstanding liabilities on June 30, 1916.....	8,610.31	
		145,522.01
Balance available for expenditure during coming fiscal year.....		1,763.09

EXPENDITURES.

Fiscal year—		Fiscal year—	
1897.....	\$5,564.48	1908.....	\$55,974.58
1898.....	4,782.01	1909.....	90,776.78
1899.....	5,428.92	1910.....	126,034.46
1900.....	8,505.24	1911.....	147,519.83
1901.....	8,623.76	1912.....	135,898.28
1902.....	16,417.87	1913.....	122,009.05
1903.....	43,897.83	1914.....	102,146.30
1904.....	71,104.16	1915.....	143,176.69
1905.....	49,712.48	1916.....	136,911.70
1906.....	24,608.58		
1907.....	48,721.15	Total.....	1,347,111.58

COMMERCIAL STATISTICS.

The following traffic passed the locks during the fiscal year ending June 30, 1916:

Items.	Designation.	Lock 1.	Lock 2.	Lock 3.
Passenger boats.....	Number.....	143	160	131
Towboats.....	do.....	434	181	163
Barges.....	do.....	959	522	484
Small craft.....	do.....	283	34	92
Rafts.....	do.....	245	20	8
United States boats.....	do.....	68	154	242
Lockages.....	do.....	1,077	503	670
Passengers.....	do.....	2,758	1,669	1,374
Cement.....	Tons.....	44	21	29
Coal.....	do.....	120,443	119,622	119,435
Corn.....	do.....	919	316	192
Cotton.....	do.....	1,068	1,185	1,309
Cotton bagging.....	do.....	19	5	6
Cotton seed.....	do.....	366	133	80
Cottonseed hulls.....	do.....	52	23	22
Cotton ties.....	do.....	86	53	47
Flour.....	do.....	557	131	94
Fertiliser.....	do.....	676	196	118
Hay.....	do.....	123	61	262
Hardware.....	do.....	582	244	179
Live stock.....	do.....	177	28	32
Manufactured steel and iron.....	do.....	1,684	432	397
Mixed feed.....	do.....	2,727	2,456	2,398
Molasses.....	do.....	23	6	10
Oats.....	do.....	2,135	1,915	2,059
Oil.....	do.....	310	116	91
Packing-house products.....	do.....	288	76	101
Produce.....	do.....	228	38	44
Sand and gravel.....	do.....		168	
Stones.....	do.....	785	730	3,009
Sugar.....	do.....	261	105	93
Logs.....	do.....	45,067	4,700	672
Lumber.....	do.....	14,275	401	47
Staves.....	do.....	16,564	6,817	4,468
General and miscellaneous.....	do.....	6,458	3,811	2,887
Coke.....	do.....		915	898
Crossties.....	do.....	5,876	1,599	670
Pig iron.....	do.....	23	20	20
Freight going up.....	do.....	14,112	9,193	8,755
Freight going down.....	do.....	207,724	137,129	130,605
Total.....	do.....	221,836	146,322	139,360

Items.	Designation.	Lock 4.	Lock 5.	Lock 6.	Lock 7.	Lock 8.
Passenger boats.....	Number.....	83	82	84	87	87
Towboats.....	do.....	897	116	96	92	104
Barges.....	do.....	1,190	382	393	426	437
Small craft.....	do.....	224	24	24	61	48
Rafts.....	do.....	85	70	31	8	8
United States boats.....	do.....	29	29	42	64	53
Lockages.....	do.....	1,345	458	424	441	449
Passengers.....	do.....	1,026	909	896	927	803
Cement.....	Tons.....	4	10	1	1	1
Coal.....	do.....	117,967	117,938	118,485	119,700	120,118
Corn.....	do.....	139	163	168	163	163

Items.	Designation.	Lock 4.	Lock 5.	Lock 6.	Lock 7.	Lock 8.
Cotton.....	Tons.....	463	364	331	325	297
Cotton bagging.....	do.....	2	2	2	2	2
Cotton seed.....	do.....	33	33	33	33	33
Cottonseed hulls.....	do.....	147	141	141	141	141
Cotton ties.....	do.....	1	1	1	1	1
Flour.....	do.....	51	50	48	47	48
Fertilizer.....	do.....	86	86	86	86	86
Hay.....	do.....	217	196	110	110	110
Hardware.....	do.....	156	134	127	126	121
Iron ore.....	do.....					
Live stock.....	do.....	20	12	10	6	5
Manufactured steel and iron.....	do.....	545	256	256	256	256
Mixed feed.....	do.....	2,727	2,352	2,350	2,262	2,197
Molasses.....	do.....	5	3	2	2	2
Oats.....	do.....	1,539	1,536	1,534	1,519	1,517
Oil.....	do.....	8	8	6	5	6
Packing-house product.....	do.....	85	83	79	79	79
Produce.....	do.....	18	19	18	18	17
Sand and gravel.....	do.....					
Stone.....	do.....	3,673	4,738	4,962	5,581	6,616
Sugar.....	do.....	90	93	90	89	87
Logs.....	do.....	79,132	15,307	3,020	1,310	2,280
Lumber.....	do.....	31	44	94	88	80
Staves.....	do.....	4,598	1,512	1,375	988	688
General and miscellaneous.....	do.....	1,353	1,180	1,141	1,143	1,347
Brick.....	do.....					
Salt.....	do.....					
Meal.....	do.....					
Crossties.....	do.....	509	274	274	274	194
Coke.....	do.....	1,063	1,063	1,063	1,063	1,063
Stave bolts.....	do.....	7,359	1,542	418		
Shingles.....	do.....	6	6			
Pig iron.....	do.....	23	23	23	23	23
Naval stores.....	do.....	552	552	552	552	552
Fence posts.....	do.....		6	1	1	1
Freight going up.....	do.....	47,384	6,739	6,491	6,504	7,613
Freight going down.....	do.....	175,207	142,963	130,310	129,189	130,517
Total freight.....	do.....	222,591	149,722	136,801	135,693	138,130
Passenger boats.....	Number.....	90	89	104	106	96
Towboats.....	do.....	124	199	217	222	372
Barges.....	do.....	547	530	677	668	816
Small craft.....	do.....	226	111	475	397	573
Rafts.....	do.....	75	1	4	6	61
United States boats.....	do.....	69	77	210	203	
Lockages.....	do.....	734	539	1,055	1,052	1,222
Passengers.....	do.....	927	1,048	948	1,175	8,064

Items.	Designation.	Lock 9.	Lock 10.	Lock 11.	Lock 12.	Lock 13.
Cement.....	Tons.....	2	2	6	6	3
Coal.....	do.....	120,560	118,135	121,182	120,672	120,896
Corn.....	do.....	174	151	151	151	
Cotton.....	do.....	251	1	1	1	2
Cotton bagging.....	do.....					
Cotton seed.....	do.....	2	2	2	2	2
Cottonseed hulls.....	do.....	143	142	142	142	
Cotton ties.....	do.....					
Flour.....	do.....	55	47	47	47	
Fertilizer.....	do.....	76	54	54	54	
Hay.....	do.....	112	103	103	103	14
Hardware.....	do.....	146	97	96	93	11
Iron ore.....	do.....					
Live stock.....	do.....	5	4	4	3	
Manufactured steel and iron.....	do.....	264	269	359	349	174
Mixed feed.....	do.....	2,195	2,190	2,190	2,190	
Molasses.....	do.....					
Oats.....	do.....	1,501	1,442	1,442	1,442	16
Oil.....	do.....	2	2	8	20	12
Packing-house product.....	do.....	81	61	61	61	
Produce.....	do.....	16	16	16	16	
Sand and gravel.....	do.....	35	1,399	150	154	
Stone.....	do.....	7,832	6,583	8,031	8,045	2,161
Sugar.....	do.....	85	85	85	71	
Logs.....	do.....	14,224	400	400	440	2,355
Lumber.....	do.....	498	1,422	1,523	1,512	4,666
Staves.....	do.....	688	436	436	436	1,622
Crossties.....	do.....	90	680	630	630	3,483
General and miscellaneous.....	do.....	1,314	1,142	1,102	1,070	394
Coke.....	do.....	1,063	1,063	1,063	1,063	1,063
Pig iron.....	do.....	23	23	23	23	
Naval stores.....	do.....	552	603	603	603	603
Fence posts.....	do.....	1	15	15	15	
Freight going up.....	do.....	9,754	7,908	8,319	8,146	1,376
Freight going down.....	do.....	142,236	128,653	131,906	131,268	130,092
Total.....	do.....	151,990	136,559	139,925	139,414	137,468

Items.	Designation.	Lock 14.	Lock 15.	Lock 16.	Lock 17.
Passenger boats.....	Number.....	86	68	58	12
Towboats.....	do.....	351	346	307	262
Barges.....	do.....	667	626	588	545
Small craft.....	do.....	207	328	313	133
Rafts.....	do.....	20	19	15	14
United States boats.....	do.....	50	44	42	28
Lockages.....	do.....	917	884	854	602
Passengers.....	do.....	8,476	7,680	7,807	2,630
Cement.....	Tons.....	764	3	3	
Coal.....	do.....	116,273	116,273	116,273	116,248
Corn.....	do.....		1		
Cotton.....	do.....	2	2	1	
Cotton bagging.....	do.....				
Cotton seed.....	do.....	2	2		
Cottonseed hulls.....	do.....				
Cotton ties.....	do.....				
Flour.....	do.....				
Fertilizer.....	do.....				
Hay.....	do.....	14			
Hardware.....	do.....	11			
Iron ore.....	do.....				
Live stock.....	do.....	1	1	17	16
Manufactured steel and iron.....	do.....	139	139	114	107
Mixed feed.....	do.....				
Molasses.....	do.....				
Oats.....	do.....	16			
Oil.....	do.....	12	12	12	9
Packing-house products.....	do.....				
Produce.....	do.....				
Sand and gravel.....	do.....				
Stone.....	do.....	1,300	1,300	1,300	
Sugar.....	do.....				
Logs.....	do.....	2,356	2,356	1,862	1,676
Lumber.....	do.....	1,501	1,302	218	156
Staves.....	do.....	1,491	1,622	1,116	985
Crossties.....	do.....	3,405	3,405	3,405	3,390
General and miscellaneous.....	do.....	368	213	194	131
Stave bolts.....	do.....				
Coke.....	do.....	1,063	1,063	1,063	1,063
Pig iron.....	do.....				
Naval stores.....	do.....	603			
Shingles.....	do.....				
Fence posts.....	do.....				
Freight going up.....	do.....	1,385	832	300	246
Freight going down.....	do.....	128,026	127,362	125,299	123,444
Total.....	do.....	129,411	127,694	125,606	123,690

Comparative table of commerce through locks on Black Warrior and Tombigbee Rivers, Ala., for fiscal years of 1914, 1915, and 1916.

Lock No.	Steamboats.			Barges.			Lockages.			Passengers.		
	1914	1915	1916	1914	1915	1916	1914	1915	1916	1914	1915	1916
1.....	702	549	645	834	679	959	1,354	903	1,077	5,334	3,461	2,758
2.....		187	496		231	522		351	508		1,084	1,669
3.....		185	536		176	484		372	670			1,574
4.....	701	485	1,019	924	614	1,180	1,354	664	1,345	280	351	1,026
5.....	550	280	227	601	496	852	922	421	456	107	164	906
6.....	437	225	222	441	442	363	683	344	424	89	149	806
7.....	153	108	243	201	259	426	585	210	441	50	175	927
8.....	128	108	244	237	275	437	263	225	449	46	159	803
9.....	156	150	283	275	346	547	249	354	734	25	159	927
10.....	162	166	365	313	315	520	314	310	539	5	708	1,648
11.....	265	294	531	390	391	677	348	782	1,055	46	564	948
12.....	268	319	530	352	364	668	756	793	1,052	798	1,443	1,175
13.....	183	415	548	134	475	816	857	945	1,262	1,725	5,589	8,084
14.....	157	358	487	142	336	667	605	718	917	2,130	5,418	8,476
15.....	145	360	458	156	321	626	796	682	884	2,824	5,739	7,680
16.....		204	407		178	588		410	854		4,695	7,807
17.....		51	302		41	545		34	602		721	2,630

Comparative table of commerce through locks on Black Warrior and Tombigbee Rivers, Ala., for fiscal years of 1914, 1915, and 1916—Continued.

FREIGHT CARRIED (SHORT TONS) AND VALUE, FISCAL YEARS.

Lock No.	1914		1915		1916	
	Freight.	Value.	Freight.	Value.	Freight.	Value.
1.....	222,511	\$4,048,818	169,697	\$2,416,653	221,836	\$2,537,733
2.....			62,986	1,118,373	146,322	1,430,002
3.....			56,090	1,052,773	139,360	1,271,221
4.....	94,324	615,119	88,920	580,779	222,591	982,154
5.....	112,118	452,462	78,965	328,345	149,722	696,148
6.....	102,808	384,786	70,127	280,186	136,801	623,712
7.....	64,567	273,518	51,736	234,228	135,693	617,612
8.....	65,418	277,372	52,163	209,597	139,120	622,729
9.....	68,957	206,038	56,467	262,658	151,990	656,411
10.....	64,828	194,484	54,068	239,784	136,559	538,646
11.....	67,227	201,681	55,361	268,668	139,925	550,795
12.....	67,241	201,723	56,069	256,201	139,414	544,328
13.....	38,680	116,040	48,979	225,437	137,468	344,445
14.....			14,873	158,341	129,411	315,163
15.....	2,169	34,527	14,288	157,703	127,694	290,213
16.....			10,320	118,700	125,608	243,368
17.....			2,843	12,762	123,680	231,169

Vessel classification.

Class.	American.	Net registered tonnage.	Passengers.
Registered steamers.....	2,485	195,384	12,249
Unregistered:			
Barges.....	2,633	396,210	.....
Small craft.....	1,490	5,958	.....
Rafts.....	508	59,630	.....
Total.....	7,116	657,182	12,249

Traffic during fiscal year.

Items.	Short tons.	Value.	Ton-miles.
Cement.....	75	\$844	10,353
Coal.....	159,358	398,395	49,780,906
Corn.....	1,026	24,894	202,626
Cotton.....	1,269	304,560	294,223
Cotton bagging.....	21	2,289	3,897
Cotton seed.....	432	10,800	75,023
Cottonseed hulls.....	209	2,926	28,935
Cotton ties.....	89	7,120	18,162
Flour.....	595	32,725	113,876
Fertilizer.....	688	13,760	141,890
Hay.....	485	9,700	47,204
Hardware.....	668	66,800	134,685
Live stock.....	203	28,420	35,157
Manufactured steel and iron.....	2,182	218,200	373,379
Mixed feed.....	3,596	118,668	926,702
Molasses.....	32	2,099	4,739
Oats.....	2,664	82,584	698,223
Oil.....	342	12,654	62,745
Packing-house products.....	428	175,200	67,923
Produce.....	287	23,700	45,892
Sand and gravel.....	357	357	6,737
Stone.....	10,503	26,257	1,116,787
Sugar.....	285	28,500	64,898
Logs, pine.....	141,069	317,393	10,915,378
Lumber.....	18,875	188,750	2,687,313
Staves.....	27,080	540,600	3,660,794
General and miscellaneous.....	8,116	811,600	1,627,762
Coke.....	1,719	8,595	240,981
Croseties.....	9,974	69,818	1,264,751
Pig iron.....	25	325	8,386
Total.....	392,562	3,638,613	174,650,299

¹ Computing ton-miles for 57,931 tons of coal from Ensley Southern Railroad crossing on Locust Fork, to Violet, La., and 650 tons of stone from Lock No. 17 to Southwest Pass, La., the above ton-miles would be changed to 82,494,648.

Increase of traffic is due principally to shipments of coal from the Birmingham coal fields to Mobile, Ala., and Violet, La. These shipments increased 114,482 tons over the preceding fiscal year.

In addition to the above, the following traffic, which did not pass through locks, originated below Lock No. 1, except 24,000 tons of pine logs handled between Locks 3 and 4:

Items.	Short tons.	Value.	Ton-miles.
Sand and gravel.....	39,228	\$39,228	2,745,960
Pine lumber.....	3,360	32,600	195,600
Iron and machinery.....	400	48,000	28,000
Crossties.....	675	4,725	47,250
Stave bolts.....	220	3,300	15,400
Logs, oak, hickory, and ash.....	3,780	14,175	264,600
Logs, pine.....	24,000	54,000	210,000
General and miscellaneous.....	3,697	269,700	188,790
Total.....	74,260	465,728	3,695,600

Statement showing cost to the United States of quarrying and loading stone on barges for delivery by steamboats to the various works on the Black Warrior and Tombigbee Rivers, Ala., during the calendar year of 1915.

Amount of stone (all kinds) quarried and delivered to various works.....	15,747.51
Labor (quarrying and loading).....	\$12,422.29
Quarry privilege.....	587.80
Explosives.....	404.35
Miscellaneous supplies.....	459.34

Total cost of quarrying and loading 15,747.51 tons of stone, at \$0.8810+----- 13,873.78

Statement showing number of tons of stone loaded for each lock at Tuscaloosa quarry during calendar year of 1915.

	Derrick stone.	Spalls.	Quarry waste.	Ton-miles towed.
Tombigbee River, Ala.:				
Lock 2.....	2,665.41	2,603.08	.....	956,231
Lock 3.....	3,026.25	1,693.13	.....	762,741
Black Warrior River, Ala.:				
Lock 5.....	961.13	.....	.....	101,183
Lock 6.....	634.29	.....	.....	61,527
Lock 7.....	415.55	.....	.....	33,867
Lock 8.....	617.17	416.25	.....	67,689
Lock 9.....	597.82	618.26	.....	58,010
Lock 10.....	.....	132.91	66.00	209
Lock 15.....	.....	760.99	.....	12,556
Lock 16.....	.....	639.18	.....	14,701
Total.....	8,817.62	6,863.80	66.00	2,058,804

Consolidated statement of cost of towing by steamboat "Nugent" during calendar year of 1915.

Month.	Labor.	Subsistence.	Fuel, oils, etc.	Repairs.	Total.	Miles run.	Ton-miles freight towed.	Cost per ton-mile.
January.....	\$723.00	\$204.06	\$435.32	\$133.31	\$1,495.71	770	379,555	\$0.0039+
February.....	828.67	168.78	341.00	67.12	1,405.57	790	212,831	.0066-
March.....	752.67	159.49	144.52	49.44	1,116.12	807	445,255	.0025+
April.....	843.00	119.55	292.95	174.79	1,429.29	750	242,423	.0058+
May.....	832.67	126.23	253.84	189.66	1,402.39	897	217,764	.0084-
June.....	651.34	128.21	296.71	7.08	1,084.34	720	166,192	.0065-
July.....	526.50	70.70	377.48	83.44	1,068.12	670	15,824	.0670-
August.....	552.33	167.70	211.25	42.45	973.73	854	86,991	.0111+
September.....	537.67	112.62	242.75	70.65	963.60	681	93,360	.0098+
October.....	574.00	148.23	182.78	107.29	962.30	1,082	155,558	.0063+
November.....	576.00	87.84	192.41	20.53	876.78	681	254,414	.0034-
December.....	669.67	111.95	343.33	32.37	1,157.32	918	198,635	.0058+
Total.....	8,107.52	1,586.38	3,284.34	978.12	13,956.36	9,720	2,473,902	.....

9,720 miles run at \$1.4358- per mile; 2,473,902 tons of freight towed at \$0.005641+ per mile ton.

7. CHANNEL BETWEEN MOBILE BAY AND MISSISSIPPI SOUND, ALA.

The U. S. dredge *Wahalak* and plant was engaged from March 22 to April 3, 1916, in maintaining this channel. In this work that portion of the channel from beacon 8 to 6,100 feet east of beacon 6, 67.7 per cent of the total length, was worked over, with the following results:

Material removed from the theoretical section.....	cubic yards.....	260, 223. 3
Total material removed.....	do.....	308, 179. 6
Total cost of dredging, including surveys, office expenses, etc.....		\$3, 895. 41
Gross cost per cubic yard for material removed from within the theoretical section.....		\$0. 0150
Gross cost per cubic yard for all material removed.....		\$0. 0126
Length of channel dredged over.....	feet.....	14, 900
Average bottom width of channel formed.....	do.....	144
Depth obtained at mean low water.....	do.....	11. 8

No other expenditures were made during the fiscal year under this appropriation.

APPROPRIATIONS.

July 25, 1912.....	\$50, 000
Mar. 4, 1913.....	20, 000
July 27, 1916.....	5, 000
Total.....	75, 000
Transferred under authority act of Mar. 4, 1915.....	20, 000
Net total.....	55, 000

COMMERCIAL STATISTICS.

(Calendar year ending Dec. 31, 1915.)

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	308,000.....	2,020	\$4,518
Cast-iron pipe.....	630 tons.....	630	15,750
Coal.....	31,602 tons.....	31,602	82,667
Cotton and by-products.....	464 tons.....	464	87,155
Cross-ties.....	33,695.....	2,999	19,522
Feed.....	4,131 sacks.....	260	7,122
Fish and oysters.....	165,059 barrels.....	16,508	368,606
Flour.....	940 barrels.....	92	6,580
General merchandise.....	2,830 tons.....	2,830	194,268
Hog products.....	7 tons.....	7	2,061
Lumber.....	1,975,080 feet b. m.....	3,950	86,289
Naval stores.....	12,363 barrels.....	3,014	129,226
Oils, refined.....	904 barrels.....	142	7,726
Sand and gravel.....	4,704 cubic yards.....	5,644	7,055
Shrimp.....	1,000 barrels.....	100	3,500
Stone.....	5,987 cubic yards.....	12,124	12,836
Sugar.....	226 barrels.....	57	7,987
Miscellaneous.....	303 tons.....	303	5,929
Total.....		82,744	998,947

8. PASCAGOULA HARBOR, MISS.

The U. S. dredge *Pascagoula* was engaged in maintaining that portion of the improvement in Mississippi Sound during the periods

from November 8 to December 28, 1915, and from January 4 to 19, 1916. In that time the dredge worked over the channel from beacon C to 8,450 feet south of beacon B with the following results:

Material removed from the theoretical section.....cubic yards.....	705,663
Total material removed.....do.....	945,862.9
Total cost of dredging, including surveys, office expenses, etc.....	\$18,479.78
Gross cost per cubic yard of material removed from within the theoretical section.....	\$0.0262
Gross cost per cubic yard for all material removed.....	\$0.0196
Length of channel dredged over.....feet.....	21,300
Average bottom width of channel formed.....do.....	203
Average depth of cut made.....do.....	20

No dredging was done during the year in the channel across Horn Island Bar.

Miscellaneous expenditures, as shown below, were also made:

Part cost of purchase and installation of plant at the United States shipyard at Pascagoula, Miss.....	\$139.78
Inspection, miscellaneous work, and upkeep of U. S. S. <i>Chickasaw</i> and U. S. launch <i>Dauphin</i>	924.90
Part cost of upkeep and repair of plant laid up on account of lack of funds.....	1,172.21

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 521).....	\$1,312,080.00
Present project:	
Mar. 4, 1913.....	(^a)
Mar. 4, 1915.....	\$20,000.00
July 27, 1916.....	80,000.00
	100,000.00
Total.....	1,412,080.00
Received for rent of U. S. dredge <i>Charleston</i>	902.42
Receipt from sales.....	161.10
Total.....	1,413,143.52

CONTRACT IN FORCE.

With the Gulf States Coal Co.,^a dated March 15, 1915; approved by the Chief of Engineers March 30, 1915; for delivery of about 5,000 short tons of bituminous coal at a unit price of \$1.38 in carload lots, and the furnishing of 2,500,000 gallons of fresh water for drinking and steaming purposes at a unit price of 8 cents per 1,000 gallons. Work under this contract was commenced on April 5, 1915; contract completed March 23, 1916. Unit price given for coal is price f. o. b. mines, coal being shipped from that point to destination on Government bill of lading over land-grant railroads.

^a \$25 of this amount was for Horn Island Pass, Miss.

^b While the present project was adopted by the act of Mar. 4, 1918, the appropriation was entirely applied to maintenance of the previous project.

^c \$10,000 allotted Nov. 18, 1915; \$10,000 allotted Dec. 31, 1915.

^d This contract also provides for delivery of coal and water for boats on other improvements.

COMMERCIAL STATISTICS.

[Calendar year ending Dec. 31, 1915.]

Vessel classification.

Classes.	Entrances and clearances.			Net registered tonnage.
	American.	Foreign.	Total.	
Registered and unregistered:				
Steamers.....	864	0	864	48,187
Sailing vessels.....	106	23	128	46,886
Small craft.....	506		506	6,203
Total.....	1,475	23	1,498	101,256

NOTE.—Of the above, 6 steamers and 128 sailing vessels of 9,310 and 46,886 net registered tonnage, respectively, were engaged in foreign and coastwise commerce.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Charcoal.....	107,600 barrels.....	3,228	\$37,660
Crabs.....	17,600 baskets.....	105	7,000
Crossties.....	77,000.....	5,968	38,500
Fish and oysters.....	9,197 barrels.....	920	63,993
General merchandise.....	1,302 tons.....	1,302	98,000
Lumber and timber.....	37,807,284 feet b. m.....	75,081	545,776
Naval stores.....	10,131 barrels.....	2,484	101,442
Slabs.....	9,373 cords.....	11,717	4,687
Terrapin.....	3,360.....	3	7,000
Miscellaneous.....	2,043 tons.....	2,043	11,512
Total.....		102,851	910,570

9. PASCAGOULA. LEAF, AND CHICKASAHAY RIVERS, MISS.

(A) PASCAGOULA RIVER.

During the fiscal year the U. S. snag boat *Escatawpa* carried on snagging operations over 19 miles of this section of river from July 1, 1915, to January 6, 1916, inclusive, removing snags and overhanging trees. The snag boat was laid up the remainder of the year on account of high water. The work accomplished was as follows:

Snagging operations.

Overhanging trees felled and cut up.....	5,896
Overhanging trees felled and pulled back.....	258
Logs cut up or stumps leveled on bank.....	143
Stumps removed from river.....	227
Snags removed from river.....	2,137
Logs removed from river.....	1,127
Bushes cut.....	8,415
Total.....	18,203
Total distance worked over..... miles.....	19
Total amount of expenditures.....	\$6,470.04
Cost of removal per obstruction, exclusive of bushes.....	\$0.661

This section has a navigable depth of 7 feet at mean low water from the mouth of Dog River to Dead Lake, 32 miles, and of 3 feet above that point, although in the upper part it is considerably obstructed by logs and snags. During the fiscal year ending June 30, 1917, it is proposed to operate the U. S. snag boat *Escatawpa* for the maintenance of the existing channel.

All work was for maintenance and was done with United States plant and hired labor. Commerce on this section for the calendar year 1915 is shown in detail under "Commercial statistics."

(B) LEAF RIVER.

No work was done on this stream during the fiscal year. This river is navigable only for rafts and logs at mean and high stages. No work is proposed for the ensuing year. No funds are available, and none are required. The commerce, which consists of logs, square timber, and crossties, on this river for the calendar year of 1915 is shown in detail under "Commercial statistics."

(C) CHICKASAHAY RIVER.

No work was done on this stream during the fiscal year. No funds were available, and none were required.

APPROPRIATIONS.

PASCAGOULA RIVER.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 521)		\$15,000.00
Present project:		
Sept. 19, 1890	¹ \$2,000.00	
July 13, 1892	¹ 3,800.00	
Aug. 18, 1894	¹ 5,400.00	
June 3, 1896	¹ 4,800.00	
June 13, 1902	4,000.00	
Mar. 3, 1905	6,750.00	
Mar. 2, 1907	6,000.00	
June 25, 1910	6,000.00	
Mar. 4, 1913	8,000.00	
Oct. 2, 1914	2,283.23	
Mar. 4, 1915 (allotted Apr. 1, 1915)	10,300.00	
July 27, 1916 (allotted)	10,000.00	
		69,313.23
		74,813.23
Amount transferred from Leaf River		1,720.57
Total		86,033.80

LEAF RIVER.

Sept. 19, 1890	5,000.00
July 13, 1892	5,000.00
Aug. 18, 1894	2,500.00
June 3, 1896	2,500.00
Mar. 3, 1899	2,500.00
June 13, 1902	2,250.00

¹Portion of Pascagoula River appropriations applied to snagging work.

Mar. 3, 1905.....	\$8, 250. 00
Mar. 2, 1907.....	2, 500. 00
June 25, 1910.....	\$6, 000. 00
Amount transferred from Chickasahay River.....	3, 000. 00
Mar. 4, 1913.....	6, 000. 00
Oct. 2, 1914.....	1, 736. 77
Total.....	42, 286. 77
Amount transferred to Pascagoula River.....	1, 720. 57
Net total.....	40, 516. 20

CHICKASAHAY RIVER.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 426) -	21, 750. 00
Present project:	
Mar. 3, 1905.....	\$2, 000. 00
Mar. 2, 1907.....	1, 500. 00
June 25, 1910.....	3, 000. 00
Total.....	6, 500. 00
Total.....	28, 250. 00
Amount transferred to Leaf River.....	3, 000. 00
Total.....	25, 250. 00

COMMERCIAL STATISTICS.

(Traffic during calendar year ending Dec. 31, 1915.)

Articles.	Amount in customary units.	Amount in short tons.	Value.
Pascagoula River:			
Round logs.....	20,000,000 feet b. m.	80, 000	\$250, 000
Square timber.....	600,000 feet b. m.	2, 400	10, 800
Piling, spars, etc.....	1,500,000 feet b. m. (750,000 linear feet).	6, 000	112, 500
Crossties.....	250,000.....	25, 000	100, 000
Hardwood.....	450,000 feet b. m.	1, 800	9, 000
Turpentine.....	200 barrels.....	40	5, 000
Rosin.....	600 barrels.....	150	5, 250
Charcoal.....	186,000 barrels.....	7, 800	58, 500
General and miscellaneous.....	500 tons.....	500	50, 000
Total.....		123, 600	601, 050
Leaf River:			
Round logs.....	20,000,000 feet b. m.	80, 000	250, 000
Square timber.....	3,400,000 feet b. m.	13, 600	61, 200
Crossties.....	150,000.....	15, 000	60, 000
Hardwood.....	1,500,000 feet b. m.	6, 000	30, 000
Total.....		114, 600	401, 200
Chickasahay River:			
Round logs.....	6,600,000 feet b. m.	52, 800	52, 500
Square timber.....	2,000,000 feet b. m.	8, 000	36, 000
Crossties.....	50,000.....	5, 000	20, 000
Hardwood.....	1,500,000 feet b. m.	6, 000	30, 000
Total.....		71, 800	138, 500

It is impracticable to obtain ton-milage.

10. BILOXI HARBOR, MISS.

No dredging was done at this locality during the fiscal year. Expenditures in connection with the work of maintenance were made during the fiscal year as follows: Examinations, inspections, and col-

lection of data for annual report, \$408.94; freight on coal used in previous year's dredging, \$133.82.

APPROPRIATIONS.

Aug. 2, 1882.....	\$5,000.00
Aug. 5, 1886.....	12,500.00
Aug. 11, 1888.....	18,500.00
Sept. 19, 1890.....	9,000.00
June 13, 1902.....	10,000.00
Mar. 3, 1905.....	9,000.00
Mar. 2, 1907.....	9,000.00
June 25, 1910.....	5,000.00
July 25, 1912.....	4,000.00
Mar. 4, 1913.....	5,000.00
July 27, 1916.....	5,000.00
Total	92,000.00
Amount returned to surplus fund of Treasury, January, 1896.....	617.73
Balance	91,382.27

COMMERCIAL STATISTICS.

[Calendar year ending Dec. 31, 1915.]

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	595,900	1,490	\$4,178
Fish and oysters.....	376,028 barrels	37,808	202,848
General merchandise.....	350 tons	350	27,000
Lumber and timber.....	4,033,088 feet b. m.	8,175	93,252
Naval stores.....	15,104 barrels	3,688	182,994
Oils, refined.....	2,825 barrels	710	22,750
Shrimp.....	12,595 barrels	1,260	44,183
Staves.....	80,000	1,000	12,000
Miscellaneous.....	236 tons	236	4,714
Total		54,512	573,617

11. GULFPORT HARBOR AND SHIP ISLAND PASS, MISS.

GULFPORT HARBOR.

The U. S. dredge *Pascagoula* worked in Gulfport Harbor during the following inclusive periods: July 3 to 20, August 23 to September 30, and October 13 to 29, 1915; and January 27 to March 17, 1916, with the following results:

Material removed from the theoretical section.....	cubic yards.....	1,583,359.6
Total material removed.....	do.....	1,694,662.8
Total cost of dredging, including surveys, office expenses, etc.....		\$52,615.19
Gross cost per cubic yard for material removed from the theoretical section.....		\$0.0332
Gross cost per cubic yard for all material removed.....		\$0.0310
Length of channel dredged over.....	feet.....	29,813.5
Length of channel dredged over twice.....	do.....	400
Average bottom width of cut.....	do.....	224
Average depth of cut made.....	do.....	22.8

Miscellaneous expenditures, as shown below, were also made:

Part cost of purchase and installation of plant at the United States shipyard at Pascagoula, Miss.....	\$262. 96
Part cost of inspection, miscellaneous work, and upkeep of U. S. S. <i>Chickasaw</i> and U. S. launch <i>Dauphin</i>	1, 019. 14
Part cost of upkeep and repair of plant previously used on the work and plant laid up on account of lack of funds.....	4, 864. 60
Operation of automatic tide gauge at Gulfport and compiling records of same.....	94. 13
Caring for property at Pascagoula, Miss., and Mobile, Ala.....	91. 95

SHIP ISLAND PASS.

No dredging was done here during the past fiscal year, expenditures being made for the following purpose:

Part cost of upkeep and repair of dredge previously used on the work and office expenses connected therewith.....	\$6, 233. 07
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APPROPRIATIONS.

Total amount expended from indefinite appropriation of July 5, 1884.....	\$22, 449. 76
Mar. 3, 1899.....	40, 000. 00
June 28, 1902.....	150, 000. 00
Apr. 28, 1904.....	10, 000. 00
Mar. 2, 1907.....	75, 000. 00
Mar. 4, 1907.....	10, 000. 00
Mar. 2, 1907 (allotted Nov. 9, 1906).....	10, 000. 00
Mar. 3, 1909 (allotted Mar. 18, 1909).....	170, 000. 00
June 25, 1910.....	100, 000. 00
Feb. 27, 1911.....	100, 000. 00
July 25, 1912.....	200, 000. 00
Mar. 4, 1913.....	87, 000. 00
Mar. 4, 1913 (allotted Aug. 1, 1914).....	9, 899. 47
Oct. 2, 1914.....	30, 000. 00
Mar. 4, 1915.....	62, 500. 00
Mar. 4, 1915 (allotted Mar. 18, 1916).....	15, 000. 00
July 27, 1916.....	85, 000. 00
Total of appropriations.....	1, 176, 849. 23
Received from steamer <i>Parkwood</i> for damages to dredge <i>Gulfport</i>	\$5, 959. 00
Received for rent of dredge <i>Gulfport</i>	4, 200. 00
Receipts from sales.....	246. 35
	10, 405. 35
Grand total.....	1, 187, 254. 58

CONTRACT IN FORCE.

With the Gulf States Coal Co.,¹ dated March 15, 1915, approved by the Chief of Engineers March 30, 1915, for delivery of about 6,000 short tons of bituminous coal at a unit price of \$1.38 in carload lots, and the furnishing of 3,000,000 gallons of fresh water for drinking and steaming purposes at a unit price of 10 cents per 1,000 gallons. Work under this contract commenced April 5, 1915; contract completed March 28, 1916. The unit price for coal under this contract is f. o. b. mines, shipment being made on Government bill of lading over land-grant railroads to destination.

¹ This allotment consisted originally of \$10,000, \$100.53 being returned to the emergencies appropriation.

² This contract also provides for furnishing coal and water for boats engaged on other harbor work.

COMMERCIAL STATISTICS.

(Calendar year ending Dec. 31, 1915.)

Vessel classification.

Classes.	Entrances and clearances.			Net registered tonnage.
	American.	Foreign.	Total.	
Registered:				
Steamers.....	1,582	100	1,682	355,762
Sailing.....	58	104	162	151,795
Small craft.....	2,595		2,595	183,273
Total.....	4,235	204	4,439	720,830

NOTE.—Of the above, 112 steamers and 162 sailing vessels of 190,836 and 151,795 net registered tonnage, respectively, were engaged in foreign and coastwise commerce.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphaltum.....	7,080 tons.....	7,080	\$65,130
Cement.....	74,997 sacks.....	3,750	27,159
Cotton.....	5,322 bales.....	1,394	264,000
Dynamite.....	257 tons.....	257	72,820
Feed.....	17,774 sacks.....	1,111	27,881
Fish and oysters.....	2,350 barrels.....	285	11,890
General merchandise.....	5,363 tons.....	5,363	293,941
Iron pyrites.....	21,237 tons.....	21,237	73,472
Lumber and timber.....	207,591,708 feet b. m.....	415,329	3,738,863
Naval stores.....	75,750 barrels.....	18,611	731,705
Oils, refined.....	1,346 barrels.....	262	12,752
Phosphate rock.....	7,283 tons.....	7,283	80,113
Staves and heading.....	657,601 pieces.....	4,986	55,679
Miscellaneous.....	3,181 tons.....	3,181	25,407
Total.....		490,079	5,470,303

12. WOLF AND JORDAN RIVERS, MISS.

No dredging was done in these channels during the fiscal year, nor was any needed, as there existed a mean low-water depth of 7 feet throughout both dredged channels on June 30, 1916.

The sum of \$25 expended was for inspection work in connection with this improvement.

APPROPRIATIONS.

Mar. 2, 1907.....	\$30,000
June 25, 1910.....	5,000
July 25, 1912.....	5,000
Mar. 4, 1913.....	5,000
Mar. 4, 1915.....	6,250
July 27, 1916.....	5,000
Total.....	56,250

COMMERCIAL STATISTICS.

[Calendar year ending Dec. 31, 1915.]

Articles.	Amount in customary units.	Amount in short tons.	Value.
Charcoal.....	42,600 barrels.....	1,278	\$7,479
Feed.....	20,853 sacks.....	1,308	23,131
General merchandise.....	6,418 tons.....	6,418	306,498
Lumber and timber.....	8,247,977 feet b. m.....	16,496	146,010
Naval stores.....	45,668 barrels.....	11,161	483,487
Total.....		36,666	1,066,606

13. EAST PEARL RIVER, MISS.

No dredging was done here during the past fiscal year.

The sum of \$112.71 was expended during the year for inspections and examinations.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 446) -	\$28,199.80
Present project:	
June 25, 1910.....	\$20,000.00
July 27, 1916.....	6,000.00
	<hr/> 26,000.00
Total.....	<hr/> 54,199.80

COMMERCIAL STATISTICS.

[Calendar year ending Dec. 31, 1915.]

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Brick.....	595,900.....	1,450	\$4,176
General merchandise.....	350 tons.....	350	24,500
Laths and slabs.....	11,727 tons.....	11,727	4,756
Lumber and timber.....	31,646,834 feet b. m.....	63,294	644,149
Oysters.....	83,414 barrels.....	8,941	20,194
Total.....		85,162	706,775

14. PEARL RIVER, BELOW ROCKPORT, MISS.

During the fiscal year ending June 30, 1916, the U. S. snag boat *Pearl* carried on snagging operations over the lower 158 miles of this section from July 1, 1915, to January 7, 1916, inclusive. The remainder of the year the snag boat was laid up, due to unfavorable river conditions, during which time plant was overhauled and repaired. The work accomplished was as follows:

Snagging operations.

Overhanging trees felled and cut up.....	4,248
Overhanging trees felled and pulled back.....	1,945
Overhanging trees trimmed.....	22

Logs cut up or stumps leveled on bank	502
Logs removed from drift piles	78
Stumps removed from river	100
Snags removed from river	1,740
Logs removed from river	210
Total	8,930
Total distance worked over	miles 158
Cost of snagging	\$18,596.11
Cost of repairs to snag boat	234.56
Total amount of expenditures	18,830.67
Cost of removal per obstruction, exclusive of repairs to snag boat	1.523

The project has been about 43 per cent completed. A maximum channel 2.1 feet deep and 50 feet wide at mean low water now exists from the mouth to Leightons Bluff, a distance of 104 miles, and thence to Columbia, 51 miles; the controlling low-water depth is 1.2 feet. From Columbia to Monticello, 56 miles, navigation is practicable only for light-draft steamers on a slight rise, and above this point on a rise of 7 feet or more.

During the fiscal year ending June 30, 1917, it is proposed to maintain the improvement by the removal of snags and overhanging trees with United States plant and hired labor.

The total expenditure during the fiscal year was \$13,830.67, all of which was for maintenance. All work was done with United States plant and hired labor. The commerce on this section of river for the calendar year 1915 is shown in detail under "Commercial statistics."

APPROPRIATIONS.

June 14, 1880	\$30,000.00
Mar. 3, 1881	25,000.00
Aug. 2, 1882	15,000.00
July 5, 1884	10,000.00
Aug. 5, 1886	13,125.00
Aug. 11, 1888	10,000.00
Sept. 19, 1890	15,000.00
July 13, 1892	15,000.00
Aug. 18, 1894	5,000.00
June 3, 1896	10,000.00
Mar. 3, 1899	7,000.00
June 13, 1902	7,000.00
June 13, 1902 (allotted May 31, 1904)	¹ 1,286.39
Mar. 3, 1905	7,000.00
Mar. 2, 1907	30,000.00
Mar. 3, 1909	15,000.00
June 25, 1910	25,000.00
Feb. 27, 1911	8,000.00
July 25, 1912	15,000.00
Mar. 4, 1913	37,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	11,000.00
July 27, 1916	35,000.00
Total	346,411.39
Receipts from sales	50.00
Total	346,461.39

¹ Allotment of May 31, 1904, was actually \$2,000; the unexpended difference was turned back into the Treasury.

COMMERCIAL STATISTICS.

Traffic during calendar year ending Dec. 31, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Round logs.....	3,380,500 feet b. m.....	13,522	\$42,256.25
Square timber.....	1,306,020 feet b. m.....	5,224	23,508.36
Piling.....	565,222 linear feet.....	11,904	89,283.30
Total.....		30,650	155,047.91

It is impracticable to obtain ton-mileage.

15. REMOVAL OF WATER HYACINTHS (EAST PEARL RIVER, MISS.).

The U. S. snag boat *Demopolis* was engaged on this work from July 28, 1915, to August 4, 1915, inclusive. A boom across East Middle River which blocked the passage of the water hyacinths to the sea was removed, and the solid mass of hyacinths being broken up into small groups were carried by the tide down East Middle River and East Pearl River to where the water was salty enough to kill them. In this work 426 logs were removed from drift piles, 110 piles were removed from the river, and 77 snags were removed. The total cost of this work, including office expenses, amounted to \$350.

APPROPRIATIONS.

Mar. 4, 1915 (allotted Apr. 7, 1915)----- \$350.00

COMMERCIAL STATISTICS.

See East Pearl River, Miss.

IMPROVEMENT OF RIVERS AND HARBORS IN THE NEW ORLEANS, LA., DISTRICT.

REPORT OF MAJ. EDWARD H. SCHULZ, CORPS OF ENGINEERS.

IMPROVEMENTS.

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4. Lake Pontchartrain and Pass Manchac, La.....	2434	14. Intracostal waterway, Franklin to Mermentau, La.....	2456
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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 830 TO 922.

1. SOUTHWEST PASS, MISSISSIPPI RIVER, LA.

This work is under the charge of Mr. Cornelius Donovan, assistant engineer, and under the local charge of Mr. J. L. Hortenstine, assistant engineer.

Operations during the fiscal year.—The following improvement work was carried on by the permanent force:

Filling the Burrwood station.—The work of filling the Burrwood station was resumed by the U. S. dredge *Delatour* on April 10, 1916, and the work is now completed. The back levee was repaired and put in good condition after the hurricane of September 29, 1915, which did considerable damage to the levee. The expenditure on this work prior to July 1, 1915, amounted to \$11,799.69 and the cost during this fiscal year was \$10,708.46, including the operation of the dredge and the work by the permanent force, making a total expenditure of \$22,508.15. This work brings the level of the station about 4 feet above mean high tide and affords a substantial protection against the severe storms that visit this locality at times.

Fire protection system at Burrwood.—The fire protection system was completed at a total cost of \$5,752.09. The expenditure on this work prior to July 1, 1915, amounted to \$3,027.03, and the cost during this fiscal year was \$2,725.06. This work affords protection to all the buildings and wharves on the station in case of fire.

Storage building.—In order to afford facilities for the cement used on the work of raising the inner portion of the jetties, a storage building was erected at Burrwood at a total cost of \$1,553.48. The building is 24 by 100 by 8 feet, and consists of a wooden frame covered with a paper roofing and inclosed with a wooden siding. The building will be used, on completion of the jetty work, for general storage purposes.

Miscellaneous work.—The work consisted in constructing a small landing wharf at Burrwood and minor equipment for the shore plant. The total cost of this work amounted to \$3,685.23.

MAINTENANCE WORK.

Dredging.—The maintenance of the lower 7 miles of the channel by dredging was carried on. The U. S. dredges *Benyaurd*, *Galveston*, and *New Orleans* were engaged on this work. The assignment of the dredges to the different localities was governed by channel developments as shown by frequent surveys and examinations.

The dredge *Benyaurd* operated in South and Southwest Passes during the year, except from July 11 to August 29, 1915, when undergoing annual repairs. The dredge operated during daylight hours, except from March 18 to June 23, 1916, when operation was continuous day and night. The dredge was operated in Southwest Pass, except the following time, when it was operated at Southwest Pass in daylight, and at South Pass at night. From November 9 to 27, March 4 to 18, April 5 to 8, and April 9 to June 26, the dredge removed 1,029,443 cubic yards of material from Southwest Pass, at a unit cost of 5.6 cents per cubic yard, exclusive of extraordinary repairs, and 6.5 cents per cubic yard including extraordinary repairs. The total cost of operating the dredge in Southwest Pass amounted to \$66,913.79.

The dredge *Galveston* was rented from the Galveston (Tex.) district at a cost of \$3,250 per month, and operated day and night in the Southwest Pass Channel from April 17 to June 30, 1916; on the latter date it proceeded to New Orleans for repairs. The dredge removed 789,020 cubic yards of material at a unit cost of 5.2 cents per cubic yard. The total cost of operating this dredge was \$41,304.72.

The dredge *New Orleans* was operated daylight hours during the year, except from June 26 to June 30, 1916, when it operated continuously day and night, and from April 13 to June 25, 1916, when undergoing annual repairs. The dredge removed 1,879,714 cubic yards of material at a unit cost of 4 cents per cubic yard, exclusive of extraordinary repairs, and 4.3 cents per cubic yard, including extraordinary repairs. The total cost of operating the dredge was \$80,071.27.

The dredge *Caucus* was rented from the the Montgomery (Ala.) district at a cost of \$55 per calendar day, and dredging in the channel entrance to Southwest Pass, at the Head of the Pass from January 24 to February 28, 1916, inclusive. The dredge removed 94,957 cubic

yards of material at a unit cost of 8.5 cents per cubic yard, exclusive of extraordinary repairs. The total cost of operating the dredge was \$8,091.56.

The dredges removed in all 3,793,134 cubic yards of material from the channel, distributed approximately as follows: 3,192,100 cubic yards from the channel seaward from buoy No. 5, 227,237 cubic yards from the jetty channel between buoys Nos. 5 and 9, 278,840 cubic yards from the main channel between buoys Nos. 25 and 37, and 94,957 from the channel entrance at head of pass. No dredging was done between buoys Nos. 9 and 25. The material dredged consisted of very fine sand and mud, the sand being in excess during the high stage of river and the mud during low river.

The total cost of maintaining the channel by dredging amounted to \$196,381.34. The dredges were not able to maintain the 28-foot available depth that existed at the close of the last fiscal year, and the channel shoaled to a minimum available depth of 19 feet at mean low water. The available depths at close of each month were as follows: July 31, 25 feet; August 31, 26 feet; September 30, 26 feet; October 31, 26 feet; November 30, 26 feet; December 31, 28 feet; January 31, 23 feet; February 29, 23 feet; March 31, 26 feet; April 30, 21 feet; May 31, 23½ feet; and June 30, 24 feet.

Repairs to jetties.—By the summer of 1915 the stone placed on the outer portion of the jetties under contract in 1914, and that at the extreme outer end of the east jetty beyond the limit of this contract, which was originally placed under a previous contract in 1911, had subsided and been washed by the seas to such an extent that it became necessary to rebuild this portion of the jetty superstructure to bring it above mean high water and restore its effectiveness. For this purpose, a contract was entered into for furnishing and placing about 12,000 tons of capping stone on the outer portion of the jetties. Work under this contract began November 22, 1915.

The work consisted in placing capping stone, varying in weight from 75 to 5,000 pounds per stone on the portions of the jetties stated above. The superstructure was brought to an elevation of 2 feet above mean high water, with a crown width of 8 feet at the inner limit of the contract, increasing to 12 feet at the outer and most exposed portion of the jetties, with natural side slopes. While work was under way, it became evident, due to the steep sea slope of the old capping at the outer ends, caused by the storms of August and September, and some settlement subsequent to letting the contract, that the 12,000 tons allotted under the contract would not be sufficient, and about 2,500 tons additional was provided for under the contract.

The work was completed January 25, 1916, at a total cost of \$58,970.60, including superintendence and inspection; 14,695.7 tons of stone was placed on the jetties, covering 4,400 linear feet. The stone was distributed as follows: 4,345 tons was placed on the east jetty between stations 22400 and 23400, a distance of 1,000 feet, and 10,350.7 tons on the west jetty between stations 14775 and 18175, a distance of 3,400 feet.

The east jetty superstructure between stations 15744 and 16182, where the stone placed under contract in 1914 had subsided and been washed away by the seas so as to bring its level below mean high

water, was repaired with 499.3 tons of capping stone purchased from the contractor placing stone on outer portion under an open-market purchase. The price paid was \$3.97 per ton, same as paid under contract for balance of work. The total cost was \$1,982.22. The superstructure was built to a height of 2 feet above mean high water, with a crown width of 4 feet and natural side slopes. The length of jetty repaired in this manner was 438 linear feet.

The addition of the stone has made these portions of the jetties effective in confining the water, and further repairs will not be needed for about two years.

MAINTENANCE WORK BY HIRED LABOR.

Raising inner portion of jetties.—The original concrete superstructure of the inner portion of the jetties had subsided to such an extent that it was considered advisable to raise the jetties to prevent loss of water at high tide. Bids were invited for raising the jetties by adding capping stone. Only one bid was received and it was for stone at \$7.50 per ton in place on the jetties, making an average estimated cost of \$22.10 per linear foot of jetty raised. This construction was considered too expensive and it was decided to do the work by hired labor and to use concrete molded in place instead of capping stone. The additional concrete was 3 feet wide, top brought to an elevation of 3 feet above mean high water, and was securely fastened to the underlying concrete by 1½-inch anchor bolts spaced 6 feet centers.

Assembling plant and drilling holes for anchor bolts was started in July, 1915, and the actual work of molding concrete was started on November 16, 1915. The work was 95 per cent completed on March 6, 1916, when operation was suspended on account of the high stage of river interfering with the work of getting material into the jetties.

There was placed on the jetties 5,150 cubic yards of concrete, at a cost of \$51,291.88, including material now on hand and the stone used in preparing the sub-base on the west jetty, or at a unit cost of \$9 per cubic yard exclusive of the material on hand and the stone. There is sufficient material on hand to complete the work which comprises raising the east jetty from station 4600 to 5600.

The west jetty was raised by use of concrete from station 1000 to 7150, a distance of 6,150 feet, and the east jetty from station 8100 to 15744, and from 16182 to 16842, a combined distance of 8,304 feet, making a total distance for both jetties of 14,454 feet. The unit cost of the jetty raised is \$3.42 per linear foot not including the material on hand to complete the work. From the west jetty station 1000 to 2964, the concrete was deposited on a sub-base of small stone, which was prepared by ridging the stone ballast on the foundation mattress along the axis of the jetty; and in addition to this, 900 cubic yards of stone was brought into the jetty to fill up the extreme low places. Burlap bags were used to mold the concrete into the interstices of the stone.

The concrete was mixed with a three-fourths yard mixer fitted up on a barge that was shifted along the jetty as the work progressed; the material was served by an elevator and chute arrangement. Movable forms in 12-foot sections were used in molding the concrete.

The maximum number of cubic yards placed in any one eight-hour day was 148.19, and the maximum number of linear feet of jetty raised in any one day was 500. A difficult feature of this work, and one that made the contractors averse to bidding, was the handling of the material over mud flats along the jetties.

The saving in the use of concrete as against capping stone was about \$250,000. The raising of the jetties has made them effective in confining the water at any stage of tide for about eight years.

Repairs to extreme inner ends of the jetties.—That portion of the jetties inshore from the line of vegetation and from the new concrete superstructure was brought to an average elevation of 2 feet above mean high water with a crown width ranging from 4 to 6 feet, by ridging the stone ballast on the foundation mattress along the center line of the jetties and, where necessary, additional stone was brought in to fill up the low places. The east jetty was repaired in this manner from station zero to 4600 and the west jetty from station zero to 1000, a total distance of 5,600 linear feet. The total cost of this work was \$6,412.18, and of this amount \$5,484.71 was for 1,700 cubic yards of additional stone and \$927.47 for labor, towing, and general supplies.

Spur dikes.—The work of maintaining the spur dikes in an effective condition was carried on by day labor. The work consisted in filling the dikes with willows and stone to an average height of 2 feet above mean high water and repairing the cribwork of Dike No. 7. The following table gives the total amount of material used in constructing and maintaining the 14 dikes, which have a combined length of 8,685 linear feet:

	Crescoted piling.	Uncres- coted piling.	Walling.	Stone.	Willows.
	Linear ft.	Linear ft.	Linear ft.	Cubic yds.	Cords.
Material used during fiscal year ending June 30, 1916..	2,620	432	432	330.5	2,375.9
Material used prior to July 1, 1915.....	175,100	23,000	40,194	21,033.0	53,380.0
Total used.....	177,720	23,000	40,626	21,963.5	55,755.9

The total cost of maintaining the dikes was \$9,985.58, distributed as follows: Materials, \$7,026.69; labor to place materials in dikes, \$740.86; towing, \$863.52; superintendence and general supplies, \$1,354.51. The average cost per linear foot of dike was \$1.15. The total cost of the dikes to date, including first cost and all maintenance, is \$312,732.31.

Repairs to dams in outlets.—The dam in Double Bayou was damaged by the hurricane of September 29, 1915, and the necessary repairs to make the dam safe were made in November, 1915, at a cost of \$450.82.

Buildings and walks.—The buildings and walks at Burrwood were kept in good condition and extraordinary repairs were made to the buildings after the hurricane of September 29, 1915. The work consisted in repairing the slate roofs of the houses, renewing the foundations under the laborers' quarters, and making minor repairs necessary to put the buildings in good condition. The total cost of the work amounted to \$5,974.36.

Wharves and floating plant.—The wharves were given a general overhauling, all barges except Nos. 14, 16, and 24 were painted and thoroughly calked above the water line. A new deck was put on the combined pile driver and derrick barge, and the barge was fitted up for the work of raising the jetties. The tug *Picket* was hauled out on the ways and the hull was calked and painted. The total cost of the work was \$4,267.59.

Coaling plant.—The coaling plant was kept in good condition, the derrick timbers were renewed, and new fender piles were driven along the front. The plant was operated throughout the year to coal the dredges and tugs at a cost of \$3,090.30, including cost of repairs.

Machine shop and ice plant.—The machine shop and ice plant were operated during the year at a cost of \$1,883.67 for the ice plant and \$12,005.38 for the machine shop; the latter cost includes general supplies purchased for repairs on the dredges. The machine-shop work consisted in making repairs to the machinery aboard the dredges and the machinery connected with the shore and floating plant.

Miscellaneous work.—This work consisted in the upkeep and sanitation of the grounds at Burrwood, caring for equipment and supplies stored at Burrwood, and the renewing of survey ranges and repairs to survey stations which were damaged by the hurricanes of August and September, 1915. The cost of this work amounted to \$4,177.28.

MISCELLANEOUS CONTRACTS.

Coal.—During the year the contractor delivered for the United States plant 16,053.45 short tons of bituminous coal, at a cost of \$55,780.03.

Willows.—The contractor for furnishing willows for maintaining the spur dikes delivered 2,378.9 cords, at a cost of \$3,496.98.

Cement.—The contractor for furnishing Portland cement for raising the inner portion of the jetties delivered 6,260 barrels, at a cost of \$8,451.

Sand and gravel.—The contractor for furnishing sand and gravel for raising the inner portion of the jetties delivered 2,321.30 cubic yards of sand and 4,630.20 cubic yards of gravel, at a total cost of \$15,871.77.

SURVEYS.

Frequent surveys and examinations were made of the lower 7 miles of channel for use in connection with the navigation of the pass and for dredging operation. Surveys were made to determine the direction and velocity of the surface and subsurface currents in the lower 7 miles of the channel and in the Gulf of Mexico at and near the entrance to the jetties, for use in connection with designing and locating additional regulation works in the outer portion of the pass.

The amount of material to be removed in June, 1916, to make the projected channel was 5,140,870 cubic yards, as compared with 5,737,400 cubic yards in June, 1915.

The total amount of material removed by dredges since dredging operation was started in April, 1905, was 28,853,403 cubic yards by United States dredges and 3,592,264 cubic yards by contract, or a total of 32,445,667 cubic yards.

The subsidence of the jetties as determined by levels taken on the original concrete superstructure is as follows: East jetty, mean subsidence during the year is 0.20 foot, and mean subsidence since the concrete was put on the jetty is 4.96 feet, which includes 0.17 foot subsidence of the bench mark upon which the levels were based; the mean subsidence of the west jetty during the year is 0.28 foot, and the mean subsidence since the concrete was put on the jetty is 5.26 feet, which includes 0.34 foot subsidence of the west jetty bench mark. The determination of the subsidence during the year is only approximate, as part of the original concrete was under water and, in consequence, accurate observations could not be made. The subsidence of the bench marks as given above covers a period of three years, the last provision for the subsidence of the bench marks being made in the Annual Report for 1913.

The condition of the channel at the present time is shown by chart marked "Plate No. 2." The available depth maintained during the year varied from 25 to 28 feet at mean low water from July 1, 1915, to January 10, 1916, and for the remaining part of the year the depth varied from 19 to 25 feet.

During the fiscal year there was expended \$24,242.04 for improvement, and \$345,872.93 for maintenance, a total of \$370,114.97.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 8d sess., p. 494)		\$924, 938. 53
Present project:		
Feb. 26, 1897 (survey)	\$10, 000. 00	
Mar. 3, 1899 (survey)	20, 000. 00	
June 13, 1902	750, 000. 00	
Mar. 3, 1903	1, 000, 000. 00	
Mar. 3, 1905	1, 250, 000. 00	
June 30, 1906	500, 000. 00	
Mar. 2, 1907	1, 000, 000. 00	
May 27, 1908	1, 170, 000. 00	
Mar. 3, 1909 (allotted Mar. 22, 1909)	275, 000. 00	
Mar. 4, 1909	330, 000. 00	
June 25, 1910	750, 000. 00	
Feb. 27, 1911	450, 000. 00	
July 25, 1912	450, 000. 00	
Mar. 4, 1913	500, 000. 00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	300, 000. 00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	400, 000. 00	
July 27, 1916	850, 000. 00	
		10, 005, 000. 00
Total		10, 929, 938. 53
Mar. 21, 1906, amount transferred to appropriation for maintenance of South Pass, Mississippi River, 1906	23, 305. 33	
Amount carried to surplus fund of Treasury	10, 112. 25	
		33, 417. 58
Net total of appropriations		10, 896, 570. 95
Miscellaneous receipts deposited to the credit of the appropriation		85, 847. 15
Grand total		10, 932, 418. 10

CONTRACTS IN FORCE.

I.

Name and address of contractor: Lester F. Alexander, New Orleans, La.
 Work: Furnishing and delivering stone at South and Southwest Passes, Mississippi River.
 Contract price: \$3,1898 per cubic yard.
 Quantity: 10,000 cubic yards.
 Date of contract: May 3, 1915.
 Date of approval: May 15, 1915.
 Date of commencement: May 20, 1915.
 Date of completion: August 18, 1915.
 Completed July 16, 1915.

II.

Name and address of contractor: R. M. Murphy Co. (Inc.), Venice, La.
 Work: Furnishing and delivering willows at South and Southwest Passes, Mississippi River.
 Contract price: \$1.47 per cord.
 Quantity: 20,000 cords.
 Date of contract: May 26, 1915.
 Date of approval: June 30, 1915.
 Date of commencement: July 1, 1915.
 Date of completion: June 30, 1916.

III.

Name and address of contractor: Robt. P. Hyams Coal Co. (Ltd.), New Orleans, La.
 Work: Furnishing coal delivered and trimmed in bunkers of dredges at New Orleans, La., and delivered in barge or boat belonging to contractor at Port Eads or Burrwood, La., or in Bayou Plaquemine just below United States lock, or points on the Mississippi River below Plaquemine, La., coal to be unloaded by the Government.
 Contract price: Delivered and trimmed in bunkers of dredges at New Orleans, by contractor, \$2.95 per ton of 2,000 pounds.
 Delivered in barge or boat belonging to contractor, at Port Eads or Burrwood, La., or in Bayou Plaquemine just below United States lock or points on the Mississippi River below Plaquemine, La., 33 cents per barrel.
 Quantity: About 10,000 barrels.
 Date of contract: June 14, 1915.
 Date of approval: June 24, 1915.
 Date of commencement: July 1, 1915.
 Date of completion: June 30, 1916.

IV.

Name and address of contractor: Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
 Work: Furnishing coal for United States plant from July 1, 1915, to June 30, 1916.
 Contract price: For coal delivered in Government yards at Port Eads or Burrwood, La., coal to be unloaded by the contractor, and scales and weighing devices furnished by the contractor (coal weighed during unloading), \$3.50 per ton of 2,000 pounds.
 Date of contract: June 15, 1915.
 Date of approval: June 30, 1915.
 Date of commencement: July 1, 1915.
 Date of completion: June 30, 1916.

V.

Name and address of contractor: Lester F. Alexander, New Orleans, La.
 Work: Furnishing and delivering stone at Southwest Pass, Mississippi River.
 Contract price: \$3.97 per ton.
 Quantity: 12,000 tons.

Date of contract: July 29, 1915.
 Date of approval: August 20, 1915.
 Date of commencement: October 10, 1915.
 Date of completion: January 25, 1916.

VI.

Name and address of contractor: J. Watts Kearny & Sons, New Orleans, La.
 Work: Furnishing and delivering cement at Southwest Pass, Mississippi River.

Contract price: \$1.35 per barrel.
 Quantity: 7,300 (more or less) barrels of cement.
 Date of contract: October 11, 1915.
 Date of approval: October 21, 1915.
 Date of commencement: November 28, 1915.
 Date of completion: January 28, 1916.
 Completed: January 22, 1916.

VII.

Name and address of contractor: Lester F. Alexander, New Orleans, La.
 Work: Furnishing and delivering sand and gravel at Southwest Pass, Mississippi River.

Contract price: \$2.15 per cubic yard for sand and \$2.35 per cubic yard for gravel.
 Quantity: 2,600 (more or less) cubic yards of sand and 5,800 (more or less) cubic yards of gravel.
 Date of contract: October 15, 1915.
 Date of approval: October 30, 1915.
 Date of commencement: December 3, 1915.
 Date of completion: February 3, 1916.
 Completed: January 17, 1916.

VIII.

Name and address of contractor: Ellicott Machine Corporation, Baltimore, Md.

Work: Furnishing and delivering spare parts for dredge *New Orleans*, as follows:

Lot No. 1.—Two dredge pumps, 26 inches in diameter; one right hand for starboard side and one left hand for port side.

Lot No. 2.—One steel chain sheave casting, No. 111, with composition bushing No. 112, fastened in sheave; two brass washers, No. 209; one steel washer, No. 211; and one steel pin, No. 203.

Four steel piston rods, piece No. 8, to be finished ready for installation.

Lot No. 3.—One water end for Blake vertical duplex piston pump, No. 198052.

Lot No. 4.—Two cast-iron pipe castings, No. 142, for discharge pipe; one cast-iron double Y piece for discharge pipe No. 141; one cast-iron double-offset Y, No. 138, for discharge pipe; two No. 139 cast-iron special elbows, 26-inch, for discharge pipe; four cast-iron key blocks; two blocks, one right hand and one left.

Lot No. 5.—One Oregon pine topmast for foremast.

Contract price: \$8,239.50 for all lots.

Date of contract: January 3, 1916 (emergency).

Date of commencement: February 2, 1916.

Date of completion: April 1, 1916 (waived for a reasonable period).

Percentage of completion at end of fiscal year: 75 per cent.

COMMERCIAL STATISTICS.

PORT OF NEW ORLEANS, LA.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[Under the columns "American" and "Foreign," is given the total of entries and clearances. Under column "Net registered tonnage" is given the net vessel tonnage for the total number of entries and clearances.]

Class.	Ameri- can.	Foreign.	Total.	Net regis- tered tonnage.	Passen- gers.
Registered:					
Steamers.....	713	2,323	3,035	6,034,788	20,768
Sailing.....	8	42	50	51,921	.....
Coastwise steamers.....	460	312	772	2,116,584	20,000
Unrigged barges.....	34	6	40	53,064	.....
Unregistered, unrigged barges.....	60	.....	60	.....	.....
Total clearances and arrivals.....	1,275	2,682	3,957	8,256,377	40,768

Foreign exports and imports, year ending Dec. 31, 1915.

Articles.	Tons.	Value.
EXPORTS.		
Agricultural implements.....	1,787	\$68,898
All animals.....	204,601	20,400,064
Automobiles, cars, carriages, vehicles, etc.....	3,277	213,035
All manufactures of iron and steel.....	185,180	5,555,406
Baking powder.....	39	18,789
Beans, peas, onions, etc.....	8,195	491,705
Potatoes and all other vegetables.....	3,322	182,710
Bituminous coal.....	11,024	40,941
Bacon and hams.....	6,219	1,761,446
Beef, canned.....	462	124,979
Beef, fresh and pickled.....	135	40,155
Other meat products.....	1,708	394,258
Corn.....	113,552	3,122,184
Flour.....	216,856	13,479,674
Wheat.....	899,117	40,578,739
All other breadstuffs.....	7,940	254,075
Cotton.....	397,706	78,847,812
Manufactures of cotton.....	8,232	678,630
Cement.....	4,108	40,798
Cottonseed cake and meal.....	145,352	5,291,002
Copper ingots, brass, and manufactures of.....	1,424	263,155
Candles.....	225	86,216
Cartridges.....	215	58,639
Corn oil.....	255	31,022
Cottonseed oil.....	26,825	3,633,590
Chemicals, drugs, dyes, etc.....	5,343	240,419
Dairy products, etc.....	1,053	417,767
Eggs.....	1,424	370,085
Barthen and stone ware.....	641	64,154
Fibers and manufactures of.....	1,185	236,999
Fish and fish products.....	2,402	390,345
Fertilizers.....	5,599	154,710
Fruits all kinds, and nuts.....	2,338	151,950
Furniture, wood, and metal.....	1,515	151,557
Glass and glassware.....	931	200,248
Glucose.....	1,111	51,794
Hay.....	13,572	238,101
Hides and skins.....	25	31,735
Logs, boards, etc.....	414,667	4,976,011
Lard and lard compounds.....	29,355	6,103,091
Malt liquors, wines, beverages, etc.....	372	241,890
Mineral oils, refined.....	290,248	4,643,943
Machinery, machines, etc.....	16,930	846,485
Oats.....	27,991	839,732
Oil, the oil, and oleomargarine.....	988	210,909
Oil, illuminating.....	462,903	5,368,178
Paraffin.....	3,871	230,830
Paper and manufactures of.....	8,358	167,079
Paints, pigments, etc.....	2,126	426,373
Pipes and fittings.....	5,219	259,554

Foreign exports and imports, year ending Dec. 31, 1915—Continued.

Articles.	Tons.	Value.
EXPORTS—continued.		
Pork, fresh, canned, and pickled.....	144	\$47,382
Roast.....	22,173	554,327
Roasted coffee.....	143	59,740
Rice.....	16,514	1,298,622
Soap stock and other greases.....	5,318	531,858
Soap.....	3,048	255,513
Salt.....	23,102	223,504
Shoes.....	1,361	748,514
All other manufactures of leather.....	1,968	98,408
Starch.....	2,046	103,635
Staves.....	63,142	1,250,604
Sulphur.....	1,254	33,774
Sugar.....	15,442	1,461,264
Tobacco.....	41,213	10,097,267
Tallow.....	648	76,893
Zinc and lead, bars, etc.....	7,717	1,820,832
Miscellaneous.....	16,469	2,470,307
Total exports.....	3,764,611	218,874,453
IMPORTS.		
All liquors and wines.....	234	125,688
Bananas.....	376,200	4,703,639
Fruits and nuts.....	11,500	574,976
Fruits, all others.....	2,698	175,379
Burlap, bagging, etc.....	27,789	3,807,180
Coffee.....	168,818	31,062,828
Cotton, manufactures of.....	485	101,906
Chemicals, drugs, and dyes.....	3,159	2,953,662
Cheese.....	104	88,924
Earthenware and china.....	2,220	222,013
Fertilizers.....	6,176	86,470
Fish, cod and haddock.....	29	4,950
Fibers, manufactures of.....	2,457	159,734
Glass and glassware.....	166	35,733
Hops.....	42	24,823
Iron and steel, manufactures of.....	48,010	576,120
India rubber.....	723	519,154
Hides.....	3,164	1,265,733
Meat.....	209	30,688
Mahogany logs.....	49,044	588,534
Macaroni.....	253	33,395
Molasses.....	86,008	860,084
Oils, all kinds.....	337,825	2,702,604
Paper, etc.....	488	73,928
Rice.....	2,816	136,272
Sisal grass.....	58,590	10,217,923
Sardines.....	69	63,709
Salt.....	329	69,412
Seed.....	263	65,094
Sugar.....	249,136	17,700,735
Tea.....	71	12,594
Tobacco and cigars.....	64	94,993
Vegetables of all kinds.....	802	152,362
Miscellaneous.....	17,993	2,683,882
Total imports.....	1,487,864	81,958,071
Total exports and imports.....	5,252,475	300,832,524

Domestic shipments and receipts, year ending Dec. 31, 1915.

Articles.	Tons.	Value.
SHIPMENTS.		
Agricultural implements and vehicles.....	23	\$1,380
Asphaltum.....	1,260	15,120
Bullion, lead, zinc, and copper.....	32,391	10,203,165
Coal.....	3,584	14,336
Cotton.....	52,121	10,424,200
Forest products.....	40,000	800,000
Fruits, vegetables, etc.....	1,533	98,996
Grain and grain products.....	11,339	397,865
Iron and steel.....	107	5,350

Domestic shipments and receipts, year ending Dec. 31, 1915—Continued.

Articles.	Tons.	Value.
SHIPMENTS—continued.		
Liquors, wines, and beer.....	3,000	\$210,000
Lumber.....	41,186	514,200
Machinery.....	238	2,300
Mineral products.....	1,679	33,580
Miscellaneous merchandise.....	151,166	12,849,110
Oil, fuel.....	495,661	3,985,288
Oil, refined.....	17,221	568,298
Rice.....	34,585	2,766,800
Salt.....	7,001	21,008
Sugar.....	23,974	2,397,400
Wool.....	731	350,880
Miscellaneous.....	1,022	102,200
Total shipments.....	919,762	45,762,965
RECEIPTS.		
Agricultural implements and vehicles.....	531	31,880
Asphaltum.....	324	3,888
Cotton.....	1,162	232,400
Fertilizer.....	40,194	1,205,820
Fruits, vegetables, etc.....	3,216	208,040
Iron and steel.....	19,783	999,150
Liquors and wines.....	5,807	371,490
Lumber.....	202	2,526
Machinery.....	3,708	370,800
Mineral products.....	13,123	262,460
Miscellaneous merchandise.....	152,892	15,256,200
Oil, fuel.....	36,896	247,144
Oil, refined.....	73,008	2,410,320
Sugar.....	3,502	360,200
Stone, sand, etc.....	15,943	47,844
Total receipts.....	363,496	22,080,141
Total shipments and receipts.....	1,283,657	67,793,106
Total foreign, in and out.....	5,252,475	300,832,524
Total domestic, in and out.....	1,283,657	67,993,106
Total.....	6,536,132	38,625,630

REPORT OF SPECIAL BOARD OF ENGINEERS ON IMPROVEMENT OF SOUTHWEST PASS, MISSISSIPPI RIVER.

OFFICE DIVISION ENGINEER, WESTERN DIVISION,
St. Louis, Mo., August 8, 1916.

From: The board of engineer officers on improvement of Southwest Pass.

To: The Chief of Engineers, United States Army.

Subject: Report on Southwest Pass, Mississippi River.

1. The board of engineer officers herewith submits its report on improvement of Southwest Pass, Mississippi River, in accordance with the following orders:

SPECIAL ORDERS, }

No. 4.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, March 1, 1916.

By authority of the Secretary of War, a board of officers of the Corps of Engineers, to consist of Col. Curtis McD. Townsend, Col. Lansing H. Beach, Col. William C. Langfitt, Col. James C. Sanford, Maj. Edward H. Schulz, will assemble at a time and place to be designated by the senior member, to consider and report upon what work is necessary to obtain a channel of project dimensions through Southwest Pass, Mississippi River, the order in which the work should be done, amount of appropriations required, and what modifications, if any, should be made in the adopted project.

The board is authorized to visit such points as it deems necessary for the proper performance of its duties.

Upon completion of the duty assigned them the members of the board will return to their proper stations.

The travel directed is necessary in the military service.

By command of the Chief of Engineers:

E. EVELETH WINSLOW,
Lieutenant Colonel, Corps of Engineers.

By Special Order No. 16, Office Chief of Engineers, 1916, Maj. E. N. Johnston was appointed a member of the board vice Col. Langfitt, relieved.

2. The board met at the district engineer office, New Orleans, La., at 10 a. m. March 25, 1916. Consideration was given to the letter of the jetty conference committee of New Orleans, La., dated November 12, 1915, to the Chief of Engineers. The reports, maps, records, and correspondence relating to South and Southwest Passes were also examined and considered.

3. Informal hearings were given to the jetty conference committee, to the Pilots' Association of Louisiana, and to the president of the Association of Commerce of New Orleans. A two-day inspection was made of the conditions at Southwest Pass, South Pass, and Head of Passes. The board adjourned March 28, 1916, to meet again at New Orleans at the call of the senior member, after additional data at South and Southwest Passes had been secured and the necessary computations and estimates prepared.

Other meetings were held at New Orleans, La., on July 25 and 26, 1916, and at St. Louis, Mo., August 7 and 8, 1916, when, having completed its report, the board adjourned sine die.

4. A joint resolution of Congress approved February 17, 1898, provided for a survey and report by a board composed of three Engineer officers of the United States Army, upon the practicability of securing a navigable channel of adequate width and of 35 feet depth at mean low water of the Gulf of Mexico throughout Southwest Pass of the Mississippi River. The board appointed in compliance with the resolution recommended the improvement of Southwest Pass by the construction of two parallel jetties 2,400 feet apart, extending seaward from near East Point on the left bank of the pass, and from Stake Island on the right bank, in the prolongation of the channel to and beyond the crest of the bar. From the two designated land points the jetties were to be prolonged inward or equivalent works constructed to contract the channel to a corresponding width up to the point where this becomes the natural width of the pass. The scour to be obtained by jetty construction was to be supplemented by dredging. The estimated cost of the work was \$13,000,000.

5. The cost of this project was apparently regarded by Congress as excessive, and the river and harbor act of March 5, 1899, directed that a board of four engineers should be appointed by the President, of whom at least two were required to be appointed from civil life. This board was to prepare a project for the improvement of Southwest Pass, and to submit "detailed estimates of the cost of each and every feature of the project, and they shall report especially whether it is necessary to construct inner jetties, and if in their judgment inner jetties shall be constructed they shall provide for the location

of the same so as to involve the least cost consistent with the safety and efficiency of the works hereby contemplated."

6. By the river and harbor act approved June 13, 1902, the report of this board was adopted and became the existing project for the improvement of Southwest Pass.

It provides for securing by dredging a channel throughout Southwest Pass 1,000 feet wide and 35 feet deep at mean low water; for the construction of jetties to protect the dredged channel at the mouth of the pass; for the closure of minor outlets; and for the construction of sills to prevent the enlargement of the outlets of the river above the pass—all at an estimated cost of \$6,000,000 and \$150,000 per annum for maintenance.

7. The board further stated that—

For ease and cheapness of construction the lines of the jetties have, as far as practicable, been placed in shallow water, and, except near the outer end, no effort has been made to keep them parallel. Their distance apart between centers varies from about 7,000 feet to a minimum of 3,000 feet.

This width, even where it is least, is greater than has been heretofore deemed advisable. This is mainly due to the fact that previous plans have generally placed the greater part of the burden of the work of forming as well as maintaining the channel upon the contraction produced by the jetties. To take from them the duty of forming the channel, which, in the judgment of the board, is the only safe course, at once changes the whole aspect of the problem. The economy in first cost to be attained by placing the jetties in shallower water can then be safely considered. Furthermore the greater area thus inclosed affords a most convenient dumping ground for the material thrown up by the dredges, and this material will assist the river to carry on more rapidly the natural process of forming its permanent banks with deposits of sediment in which the inner portions of the jetties will ultimately be buried, as has happened at South Pass.

8. The act of 1902 also provides that the details of the work may be modified at the discretion of the Secretary of War. By the act of May 28, 1908, dredging in the river at the Head of the Passes and as far up as Cubits Gap, a distance of $3\frac{1}{2}$ miles, was authorized whenever necessary to secure a depth of 35 feet with practicable width.

The total expenditures on the existing project to June 30, 1916, are \$8,939,003.31.

9. The project of the board of 1898 was based on principles whose correctness had been demonstrated not only at South Pass, but at other delta mouths. These principles have recently been summarized in a paper by Dr. Elmer L. Corthell, on Contracting and Regulating Works at Mouths of Rivers, presented to the second Pan American Scientific Congress, as follows:

First. There should be two parallel jetties (or training works) connected with the ends of the land or the shores.

Second. The effective distance between the jetties should be that of those sections of the river, or outlet, where the best channel exists by nature.

Third. Projection of the jetties into the sea into about the depth of water required in the new channel by navigation, and in a direction either straight or curved, to meet the predominant sea currents at as nearly a right angle as possible.

Fourth. The jetties should be built their entire length well above the surface of high tide, so as to utilize the whole flow and prevent the deposit of material brought by the waves in the channel.

Fifth. The sea bottom should be protected from scour in advance of the progressing jetties to prevent scour beyond them.

Sixth. It is *sine qua non* that the jetties should be pushed to completion as rapidly as possible to prevent the re-formation of the bar in advance, as happened at the mouth of the Rhone and at other works, leading to extra cost and often to failure.

Seventh. In the case of jetties where the tides are of sufficient amplitude to greatly accentuate the velocity of the tidal current by the works, the jetties should maintain their parallelism landward until they join the river banks at a point where the river has the normal depth of the proposed channel. If this rule is not followed there is likely to be a troublesome deposit in the area above the land ends of the jetties, made either from the sedimentary matters of the river itself or by material excavated out of the bar channel by the incoming flood-tide current.

10. The project of the board of 1899 did not comply with these principles and was admittedly an experiment in an effort to obtain the desired results at a decreased cost. The first board relied on jetties to create and maintain a channel, with incidental dredging to prevent any radical change in regimen while the work was in progress, while the second relied on dredging alone to remove river deposits, the jetties being only used to prevent the destruction of the channel by wave action from the Gulf. It was expected that along the inner side of the jetties banks would rapidly be formed by river deposits or be created by the deposit of the dredged material, but 10 years' experience has shown that the river banks have not built up by accretions as rapidly as expected, and the material dredged, if deposited inside the jetties, does not remain in place, particularly during high stages of the river, but is carried out and largely deposited on the bar. It is impossible without the aid of some restraining works to retain the material deposited in place until it has become sufficiently consolidated to resist the river currents.

11. The existing irregularities in the cross section cause at times enormous deposits. In November, 1905, the amount required to be removed to complete the project dimensions of 35 feet by 1,000 feet was about 18,300,000 cubic yards. To July 1, 1916, 32,445,667 cubic yards have been dredged, and there remained to complete the project 5,140,870 cubic yards, indicating a fill during the past 10 years of over 19,000,000 cubic yards. Since 1912 the amount of annual deposit has exceeded the annual amount the dredges have removed, due largely to the excessive floods of 1912, 1913, 1915, and 1916. While, in 1912, there existed a navigable channel of 31 feet throughout the pass, during the past year the depth across the bar has varied from 19 to 28 feet.

12. An attempt to remedy these conditions has been made by the construction of a series of spur dikes, limiting the width of channel between dikes to about 3,000 feet, but experience has shown that these dikes have not produced a uniform velocity throughout the channel, and the fill along the jetties has been slow.

13. It was also found impossible to build the jetties to the bar as contemplated, and they had to be stopped about 2,000 feet short of the proposed length. At this point the bottom of the Gulf was so soft as to be unable to support even the foundation mattresses, and

construction had to be abandoned for the time being, as it was necessary to permit wave action to consolidate the bar before they could even be constructed to the length originally designed.

14. The board considered it advisable to make a series of observations of the flow of currents, both in South and Southwest Passes, and in the Gulf of Mexico in front of the Passes, which are summarized in the appended report of the district officer. The report also gives a brief history and description of the work which has been done at the different Passes.

15. Most of the observations were taken during relatively calm weather and indicated a strong subsurface flow to the eastward in front of both Passes at the time they were taken. Some other tests showed a marked drift to the west, which direction of flow was that stated by the pilots and vessel men as generally existing at the mouths of the river. The surface currents followed generally the fanlike spread of the silt-bearing fresh water as it spread out over the heavier salt water, with perhaps a tendency to the west. The board regrets that time has not been available for further observations, and that it has been impossible to secure any during heavy or rough weather; but the strength of a current having been fairly well established of sufficient force to be of value in dispersing the sediment carried over the bar, it was not regarded as advisable to delay the report for further data. The board believes, however, that further observations should be taken to develop the actual conditions of current flow throughout the year at both Passes.

16. If Southwest Pass is to be improved to a predetermined area of section, a change in the relative discharge of the three passes can not be permitted. If the flow through Southwest Pass is diminished, the depths designed will not be attained, while if it be increased, there is danger of excessive scour undermining the works of improvement. The South Pass is shorter than either Southwest Pass or Pass a Loutre, and the slope from the Head of the Passes to the Gulf must therefore be the greatest through South Pass, and when a regularity of cross section has been obtained there is necessarily a tendency for its discharge to increase. Since its improvement its section has also enlarged, and the volume of flow through it has increased over 50 per cent in the last 10 years, and at the expense of Southwest Pass.

17. The enlargement of section of the South Pass is injuriously affecting both passes; the Southwest Pass by reducing its discharge, and the South Pass by caving its banks to such an extent as to endanger their stability. The board considers the danger so imminent that it has submitted a special report recommending an immediate appropriation by Congress to provide for a sill across South Pass and to repair the one across Pass a Loutre, to reduce their flow. This recommendation has received favorable action.

18. At the Head of Passes the Mississippi River has an abnormal width in which there is a liability during high stages of the river for a bar to form having depths over it less than 35 feet. A contraction of the river at this locality by spur dikes is necessary to prevent the periodic formation of this bar, which at present is removed by dredging.

19. To correct the defects above indicated the board recommends the following modifications and extensions of the original project:

(1) A system of spur dikes above the Head of the Passes contracting the width of the river to about 5,000 feet, which is the width immediately above where good channel conditions exist. In the construction of these dikes great care must be exercised so that while removing the bar which obstructs navigation, they do not cause an injurious change in the relative flow of the three passes. For the purpose of preparing an estimate a tentative system of dikes is indicated on the map of the Head of the Passes, accompanying the district officer's report, but conditions are so complicated that the actual location of the channel should be determined by careful observation as the work progresses.

(2) A sill across the head of South Pass to limit the flow through it, repairs to the sill across Pass a Loutre, with bank revetment around the Heads of the Passes connecting with the sills so as to avoid the danger of the river cutting away the banks behind them.

(3) To correct the irregularities of cross section between the jetties it is recommended that two timber bulkheads, similar in general design to those constructed at Burrwood be built from Burrwood to the ends of the jetties forming a straight channel of a width of 2,400 feet, and that the required increase in area of cross section be obtained as much as practicable by dredging, the dredged material to be deposited in the pockets formed by the existing spur dikes behind the bulkheads. By this means the permanent banks contemplated by the second board can be built up by deposits of dredged material. These bulkheads will probably require protection from scour by river currents, and an estimate for this purpose has been included. Near Burrwood the necessary contraction is to be obtained by a system of spur dikes with a channel width between their outer ends of 2,400 feet.

(4) To overcome the bar advance during the past four years a further extension of the jetties is necessary. These extensions should be made on the lines of the bulkheads, but of similar design to the original jetties, and should be constructed to deep water across the bar as rapidly as possible.

20. The heavy deposits on the bar at South Pass during the last flood in the Mississippi indicate that if it is to be economically maintained at project depths a further extension of the jetties has become necessary.

The board does not, however, consider it advisable to extend the jetties at the South Pass at the present time. Until the Southwest Pass can be developed, the South Pass can be maintained, with possible short interruptions, by dredging, though at an increased cost, for which the board recommends that provision be made in the annual estimates.

21. Estimate of cost:

Construction of spur dikes at Head of Passes.....	\$160,000
Sill across head of South Pass, and repairs to Pass a Loutre sill, and revetment at Head of Passes.....	230,000
Spur dikes, vicinity of Burrwood.....	350,000
Longitudinal bulkheads and protection of same.....	2,000,000
Extension of jetties.....	675,000

Dredging within jetties.....	\$275, 000
Dredging on bar.....	400, 000
	<hr/>
	4, 080, 000
Engineering, superintendence, and contingencies, and maintenance during construction.....	510, 000
	<hr/>
Total	4, 600, 000

22. The board considers that the work first to be performed should be the construction of sills and bank revetment at the Head of Passes, and it is understood this work has been included in the estimate of expenditure of funds appropriated by the river and harbor act of July 27, 1916. The remaining funds available from this appropriation—\$550,000—after allowance has been made for this year's dredging and repairs to existing works, should be expended in commencing the construction of the bulkhead and filling in with material to form the banks.

During the next fiscal year an appropriation of \$2,000,000 is recommended, to be expended on the completion of the bulkhead and the extension of the jetties and in dredging.

The remainder of the estimate—\$1,820,000—should be provided for in 1918.

Attention is invited to the fact that unless the work is done as rapidly as recommended its cost will be greatly increased.

23. While the amount now estimated as required for completion constitutes a substantial increase of the estimate of the board which prepared the existing project, it may be noted that the total cost as now estimated is in substantial agreement with the estimate prepared by the first board.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS,
September 7, 1916.

To the SENIOR MEMBER,

BOARD OF ENGINEERS FOR RIVERS AND HARBORS:

For recommendation. By command of the Chief of Engineers:
W. KELLY,
Major, Corps of Engineers.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
September 12, 1916.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

The board concurs in the views and recommendations of the special board.

For the board:

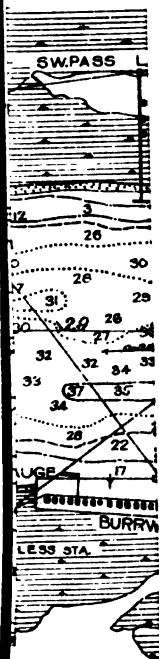
FREDERIC V. ABBOT,
Colonel, Corps of Engineers, Senior Member of the Board.

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS,
September 27, 1916.

Approved.

W. M. BLACK,
Chief of Engineers, United States Army.



DISTANCES IN	
JETTY STA.	JET
7026	
0	
8407	
18627	
1ST JETTY ISL	
1ST	244

SCALE
1 2 3 4 5
MILES
Office, New Orleans, La., August 1916.
Approved: *Edward W. Schuch*
Augustine Engineer. Major, Corps of Engineers
File No 5-W.P. 23/40

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SOUTH PASS.
OF MEXICO FROM ENDS OF JETTIES
TO DEEP WATER.

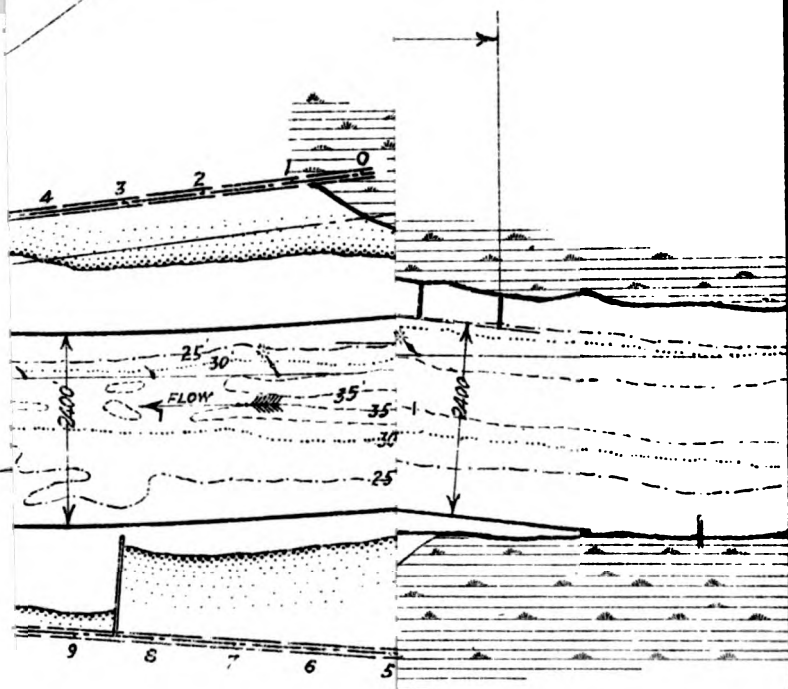
sheet. Sheet No 1. Scale

per Office N.O. La. May 1916. Port Eads, La., May 15, 1916.

by: Submitted by: Approved:
E. Washburn. Cornelius Donovan. Edward Peleng
Jr. Engr. Asst. Eng. Major, Corps of Engrs USA

J.M. File No S. P. 17/29

2d Sess. IN 23 PLATES - PLATE 16



represent spur dikes to
be placed where

bulkhead to be protected
mattress work, where

as shown by double line, thus:
and spur dikes shown

I RIVER, LA.
EST PASS
ITY EXTENSION
& SPUR DIKES.

SCALE:

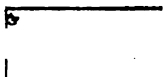
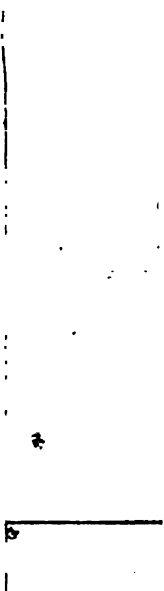
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New Orleans, La., August 1916.

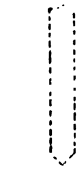
Approved: *Edward B. Chug*

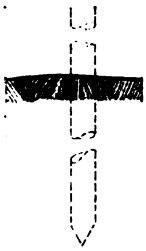
Major, Corps of Engineers, U.S.A.

S.W.P. 12/49

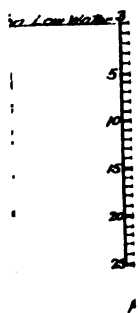


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Mean High Water
Mean Low Water



2. SOUTH PASS CHANNEL, MISSISSIPPI RIVER, LA.

This work is under the charge of Mr. Cornelius Donovan, assistant engineer, and under the local charge of Mr. Allen E. Washburn, junior engineer.

Operations during the fiscal year.—During the fiscal year the following work was carried on: Maintenance of the existing jetties and auxiliary works; repair of storm damage, cave in bank, and crevasse in the inner east jetty; upkeep of plant; dredging to maintain the channel; and enforcement of the navigation rules. A hurricane on August 15 and 16 caused considerable damage at the head and near the mouth of the pass; and on September 28 and 29 a very severe hurricane caused damage estimated at \$11,441 to the works and plant along the whole length of the pass. In detail, the operations and results were as follows:

Outlying works.—No work was done on mattress sills across the Jump, Cubits Gap, and Pass a Loutre. All are effective, although the shore-lap portion has been lost by decay. One thousand linear feet of the Pass a Loutre sill near its western end is unsafe because of undermining at the downstream edge. Reinforcement of the short arm of this sill has been authorized. Two steamers were aground on this sill, but no known damage was caused.

There was no work on the dam across the crevasse in the south bank of Pass a Loutre. This dam has disappeared, and the "crevasse" has become a bayou about 950 feet wide.

At Head of Passes (see Pl. No. 6).—On the headland between South Pass and Pass a Loutre, the T-head ("Upper Dam") was injured by two storms. Later it was badly damaged by the steamship *Coppename*, which demolished 100 linear feet of the western end and weakened all the rest of the structure. The eastern end was then tied in place with cables, at a cost of \$51.96. The T-head will be rebuilt during the low-river season. Spur dike No. 1 in Pass a Loutre was refilled with brush at a cost of \$143.50. Protection of the western side of this headland with mattress for a distance of 2,000 feet has been authorized, to connect at the lower end with a proposed mattress sill across South Pass. Total expenditures for maintenance of this headland during the fiscal year were \$195.46.

On the headland between South and Southwest Passes 180 linear feet of west dike on the South Pass side was destroyed by undermining. Removal of the wreckage cost \$21.40 and renewal of the brush in a part of this structure cost \$125.15. In carrying out authorized work 350 linear feet of the upstream end of west dike will be removed and the remainder rebuilt and protection mattresses will be placed on both sides of it. To reshape the bank immediately below west dike where a large cave occurred on June 30, 1915, a dam was built of piles and brush at a cost of \$1,250, and later refilling cost \$255.42. This dam was entirely wrecked by further caving and scour during the present river flood. Repairs have been made, but mattress protection is authorized. The bank-alignment dams on both sides of this headland are in effective condition and no repairs were made. Complete mattress revetment is authorized. The total cost of work at Head of Passes was \$1,847.48.

Along South Pass.—There has been considerable caving of the west bank above "Depot Point," but this was beneficial in straightening

the channel. In the stretch of channel at a point 2 to 2½ miles below the Head of the Passes, where the west bank is only 150 feet to 400 feet wide, it has caved badly. Protection work is needed to prevent caving. Caving has also occurred at a point about 5 miles below the Head of the Passes, but so far has not developed seriously. Spur Dikes 8 and 15 were refilled at a cost of \$478.40. Repairs were made to brush and stone revetment at a cost of \$505.78. At Port Eads the plank revetment along the west bank was entirely destroyed by the storm. The total cost of maintenance work along the Pass was \$984.18.

Near mouth of South Pass (see pl. No. 4).—In the jetty channel the mattresses which have been placed to stop undermining of the inner jetties remained effective without repairs during the fiscal year. The channel is very deep and irregular and there has been caving at two localities on each bank, but protective work has not been placed to date.

Spur Dikes Nos. 1, 8, and 20 were destroyed by caving. Nos. 1 and 8 were rebuilt, but No. 20 will not be rebuilt. Repairs were made to Nos. 1, 4, 8, 10, 12, 14, 21, 30, 31, 32, 33, 35, 37, 39, 40, 41, 45, 47, 49, and 50, at a cost of \$1,904.82.

Ordinary repairs to the inner east jetty, which is 11,170 feet long, comprised the renewing of the piles, brush and stone lost by storms, teredo attack, and natural decay. This included the closure of a gap 175 feet wide and replacing 150 linear feet of the channelward face. The total cost of repairs to this jetty was \$35,683.75. The average cost per linear foot of jetty actually repaired was \$4.25, or a cost of \$3.37 per linear foot for maintenance of the entire jetty.

Near its inshore end the scour of a large whirlpool undermined 135 linear feet of the channel side of the inner east jetty and gave an outlet to the Gulf. The flow through this crevasse soon became 120 feet wide and 18 feet deep, with a fall of more than a foot in the width of the jetty. Repairs were begun at once, and with considerable difficulty a closure was effected with the plant and materials then on hand. By driving two rows of piles across the crevasse and filling in between with brush and stone the flow was entirely stopped. But the new work is only half the width of the former jetty, the depth of water now being too great for rebuilding out to the channelward face. The cost of closing this crevasse was \$3,514.08. The total expended on the inner east jetty was \$39,197.83.

Two hundred and eighty linear feet of the inner west jetty at sections 11 to 14 was destroyed by undermining, and there was evidence of underwater caving or scour at section 16. But as there now is solid land in rear of entire length of this jetty immediate repairs were not necessary. Repairs were confined to the renewal of brush and stone in the crib and the pile structure which form the seaward 800 linear feet of this jetty. These repairs during the fiscal year cost \$1,836.20.

The total expenditures for maintenance of works near the mouth of South Pass during the fiscal year were \$42,938.85.

Floating plant.—Operation expenses, without allowance for depreciation, are apportioned to the various work for which the plant was used. The steam launch *General Reese* was used for examination and surveys. Repairs were made to the tug *Uacha*, which included renewing propeller shaft, bearings, and machinery, heater

sifted, and decayed deck renewed. The total cost of repairs was \$686.11. Repairs were made to derrick barge, headblocks, fender strakes, etc., \$191.15; new boiler installed, \$470.10; total, \$661.25. Repairs were made to pile driver, barges *No. 16* and *No. 20*, and two skiffs, at a cost of \$677.01, a total cost for maintenance of floating plant of \$2,024.37.

Shore plant.—The coaling plant was operated throughout the year. The plant is worn out and must be replaced. Frequent repairs to the bins, yard, derrick, and machinery were required. New machinery has been purchased at a cost of \$1,780. Repairs and operating cost of plant amounted to \$1,039.15, total expended \$2,819.15. Repairs were made to Wharf E, rebuilding mooring for plant because of caving bank, and renewal of decayed mooring piles; a total expenditure of \$852.20. Thirty-three houses at Port Eads were maintained for office, shops, and dwellings. Repairs were made, consisting of replacing house No. 12 on foundation; renewal of foundations under 11 houses; repairs to roofs of all buildings, and general painting; building shed over 8 metal cisterns; rebuilding walks, closets, installation of 6 new metal cisterns, removing debris after storm, upkeep of grounds, at a total cost of \$11,021.88. Repairs were made to machinery, storage of materials and supplies, care of property and equipment and delivery of materials sold, at a cost of \$3,822.60, a total cost of maintenance of shore plant of \$18,515.83.

Dredging.—No dredging was required at the head of South Pass or in the pass itself. On November 9 to 27, inclusive, the dredge *Benyaurd* operated in the channel seaward from the ends of the jetties. This dredging was necessitated by a tendency to shoal across the channel about 1,200 feet from the end of the east jetty. Eighty-five thousand eight hundred and seventy-nine cubic yards of material was removed. During the latter part of February a shoal occurred and reduced the navigable depth at the sea entrance to pass from 33 feet to 25 feet. The shoal consisted of heavy material which was discharged from South Pass, and for some time the shoal increased while dredging was in progress. The dredge *Benyaurd* operated between March 3 and June 30, inclusive, in this locality, removing 331,280 cubic yards of material. The dredge *Caucus* operated between February 29 and June 30 at the same place, removing 577,276 cubic yards of material. The area dredged was 2,200 feet long and 500 feet wide. In practically all of this area the channel has been restored to a minimum depth of 29 feet. The channel is very irregular, and some points and lumps remain, which make navigation difficult for deep ships. Combining the two dredges, there were 229 days of dredging operations in the channel. Total cost of dredging was \$58,112.22.

Condition of the channel.—With the exception of the channel through the shoal seaward of the ends of the jetties, the channel was in very good condition throughout the fiscal year. The river flood has caused excessive scour at the Head of the Passes, where the works are now threatened by such depths as 84, 97, and 128 feet in proximity thereto; in the pass itself, the central depth varies between 40 and 109 feet, and in the channel between the jetties, depths of 70 to 80 feet have caused undermining of the jetties and spur dikes.

At the end of each month the depths were as follows: July 31, 1915, 30½ feet; August 31, 28 feet; September 30, 30.5 feet; October 31, 32 feet; November 30, 30.8 feet; December 31, 32 feet; January, 1916, 31½ feet; February 29, 26 feet; March 31, 25 feet; April 30, 28 feet; May 31, 29½ feet; June 30, 31½ feet.

Navigation of the channel.—The total number of vessels which navigated the passes amounted to 3,999, of which 3,395, or 84.9 per cent, navigated South Pass. The total number of vessels drawing 25 feet and over amounted to 505, of which 461, or 91.3 per cent, navigated South Pass.

In the first half of the fiscal year there were but two navigation accidents—the outbound steamship *Maartenskijk*, drawing 29 feet 7 inches, which grounded on the western edges of the channel beyond the jetties, and the barge *Harry Morse*, which ran on the end of the east jetty when the tug which was towing it became disabled. There were four accidents at different localities attributable to fog. These included the steamship *Coppename*, which demolished upper dam at the Head of the Passes, and the steamship *Caloria*, which was aground on the mattress sill across Pass a Loutre. Since the beginning of the shoaling in the channel seaward from the jetties, in February, 24 ships have been aground in that locality, drafts ranging from 15 to 28½ feet.

All work at South Pass was done by hired labor and Government plant. The total materials used amounted to 16,521 cords of willows, 3,053 cubic yards of stone, 377 piles, 32 waling timbers, 100,840 feet board measure of lumber, and 654.5 tons of coal. The total amount expended during the year was \$140,658.55 for maintenance.

APPROPRIATIONS.

Mar. 3, 1875, and amendatory acts (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 495)-----		\$8, 000, 000. 00
Aug. 11, 1888 (allotted June 6, 1900)-----	\$10, 000. 00	
June 13, 1902-----	75, 000. 00	
June 30, 1906-----	50, 000. 00	
Mar. 2, 1907-----	50, 000. 00	
May 27, 1908-----	50, 000. 00	
Mar. 3, 1909 (allotted Apr. 7, 1909)-----	80, 000. 00	
June 25, 1910-----	40, 000. 00	
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	50, 000. 00	
July 27, 1916-----	150, 000. 00	
Fiscal year ending June 30—		
1901-----	29, 974. 87	
1902-----	104, 290. 53	
1903-----	108, 398. 27	
1904-----	65, 964. 08	
1905-----	105, 214. 12	
1906-----	104, 786. 14	
1907-----	99, 888. 74	
1908-----	97, 852. 27	
1909-----	93, 089. 78	
1910-----	100, 848. 59	
1911-----	82, 125. 53	
1912-----	78, 234. 60	
1913-----	127, 840. 09	
1914-----	96, 077. 24	
1915-----	75, 685. 08	
1916-----	129, 519. 00	
		2, 054, 788. 98
		10, 054, 788. 98

Mar. 21, 1906, transferred from appropriations for improving passes of the Mississippi River (credited to fiscal year appropriation for 1906)-----	\$100. 25
Mar. 21, 1906, transferred from appropriations for improving Southwest Pass, Mississippi River (credited to fiscal year appropriation for 1906)-----	23, 305. 33
	<hr/>
Amount carried to surplus fund of the Treasury-----	10, 078, 194. 51
	867. 02
	<hr/>
Net total of appropriations-----	10, 077, 827. 49
Miscellaneous receipts deposited to the credit of the appropriation-----	1, 406. 69
	<hr/>
Grand total of receipts from all sources-----	10, 079, 234. 18

CONTRACTS IN FORCE.

I.

Name and address of contractor: Lester F. Alexander, New Orleans, La.
 Work: Furnishing and delivering stone at South and Southwest Passes, Mississippi River.
 See I of abstract of contracts for Southwest Pass, Mississippi River.

II.

Name and address of contractor: R. M. Murphy Co. (Inc.), Venice, La.
 Work: Furnishing and delivering willows at South and Southwest Passes, Mississippi River.
 See II of abstract of contracts for Southwest Pass, Mississippi River.

III.

Name and address of contractor: Robert P. Hyams Coal Co. (Ltd.), New Orleans, La.
 Work: Furnishing and delivering coal in bunkers of dredges at New Orleans and in barge or boat belonging to contractor at Port Eads or Burrwood.
 See III of abstract for Southwest Pass, Mississippi River.

IV.

Name and address of contractor: Tennessee Coal, Iron & Railroad Co., New Orleans, La.
 Work: Furnishing and delivering coal required for the works at South and Southwest Passes, Mississippi River.
 See IV of abstract of contracts for Southwest Pass, Mississippi River.

3. EXAMINATIONS AND SURVEYS AT SOUTH PASS CHANNEL, MISSISSIPPI RIVER, LA.

This work is under the charge of Mr. Cornelius Donovan, assistant engineer, and under the local charge of Mr. Allen E. Washburn, junior engineer.

Operations during the fiscal year.—Consisted of the maintenance of a survey boat and stations, ranges, etc., accessory to surveys, keeping records of the tides and water levels, measurements of discharge through the outlets of the Mississippi River, and observations of the currents between the jetties and in the Gulf of Mexico.

Two hurricanes destroyed all channel and survey ranges. These have largely been replaced.

Because of much unusual work the 50-foot survey boat has not been docked during the year. This boat was utilized practically all the time for survey work, and the expenditures therefor were: Miscellaneous repairs, \$152.91; operations, including crew of 5 men, \$5,168.40; total, \$5,321.31.

During the year the total expenditures were \$10,195 for maintenance.

CHANNEL SURVEYS.

Two surveys were made in the main river from above Cubits Gap to Head of Passes. Large masses of heavy sand moving along the bottom were found, and this sand frequently forms into sharp peaks with such submergence that the deeper-draft vessels ground on them. Such peaks were found in midstream, while the western half area of the river is free of them. The conditions are constantly changing while the river is at flood stage. (See chart No. 53.)

At Head of Passes examinations of the channels were made each 10 days or oftener, as required. Complete surveys, which were made each month, showed few changes in the first half of the year. Then, influenced by the sharp river floods, the channel entrance to Southwest Pass became seriously shoaled, while enormous scour occurred elsewhere. The channel entrance to South Pass became more than 40 feet deep, referred to low water, with a width of more than 500 feet between the 36-foot depth contours. In Pass a Loutre depths of 69 feet to 128 feet were found immediately below the mattress sill. Close to the headland between the passes there are depths of 84 and 97 feet. At present the tendency is toward a decrease in depth, as some of the sand in the main river is moving down into the narrow channels. Conditions at the end of the fiscal year are shown by chart No. 53.

The usual complete survey of South Pass was not obtained because of lack of low-water season, destruction of ranges, and conflict with other work. Examinations of the shoaler reaches were made each month and showed that the changes which occurred were a general deepening in the latter half of the year. A late examination through the length of the Pass showed that there is a depth of 40 feet or more referred to low water on every cross section of the Pass. The average central depth is about 50 feet, but depths between 60 and 109 feet obtained in many localities all along the Pass. In the channel between jetties, the central depth ranges between 42 and 80 feet at mean low tide.

Seaward from the ends of jetties, monthly surveys were made with as much regularity as the weather permitted. Channel surveys and examinations were made much more frequently when required. With the exception of a slight shoaling in November, a very good channel was found to exist until the end of February. Then the channel shoaled very rapidly and there was unprecedented activity of the mud lumps near by. The navigable depth was reduced to 25 feet at mean low tide, and there were shoals with depths of 15 to 19 feet, which interfered with navigation. In the last three months the channel has improved steadily. It is now very irregular, with depths ranging between 29 and 47 feet, but the navigable depth is 33 feet at mean low tide. Present conditions are shown by chart No. 54.

MISCELLANEOUS SURVEYS.

A survey in Cubits Gap was made in connection with those in the main river. Considerable shoaling in some localities was found to have occurred in recent years, but the overflow of water has decreased very little.

Local surveys were made where bank caves occurred or unusual conditions were indicated.

The shoals and mud lumps adjacent to the mouth of South Pass were surveyed. The main shoal or bar was found to have built up and outward quite rapidly, on the western side of the channel this advance having been about 600 feet in the last four years. Soundings taken out beyond the 20-fathom depth in the Gulf of Mexico showed that the bottom contours were roughly concentric, the seaward slope being generally 1:800. (See chart No. 54.)

Current observations with floats were made in the channel between jetties and in the Gulf. The results were rather inconclusive because the observations could not be made on large enough scale.

RECORDS.

Records were kept of the tides and water levels at Head of Passes and at Port Eads. At Head of Passes the variation of water surface due to river was 4.7 feet maximum and 2.7 feet average, while the range of tide averages 0.8 foot. At the mouth of South Pass the difference between the mean high and low tides was 1.3 feet, and the stage of river has no effect on the water level. The reference planes used for soundings were mean low tide during low river at Head of Passes and mean low tide during the calendar year at the mouth of the Passes.

DISCHARGE MEASUREMENTS.

Measurements of the discharge through the outlets of the river, begun in the preceding year, were continued until November 5, when the river reached low stage. In the fiscal year 49 measurements were made of each of the three main passes, 4 each of the three minor outlets, and 15 experimental measurements at the head and mouth of South Pass. From all measurements made, the following final results were computed:

Discharge in cubic feet per second through each outlet.

	Maximum.	Minimum.	Average.
The Jump.....	28, 140	11, 419	20, 408
Cubits Gap.....	116, 646	58, 877	88, 813
South Pass.....	124, 997	41, 818	81, 633
Southwest Pass.....	353, 241	147, 139	236, 808
Pass a Loutre.....	362, 063	146, 028	200, 156

The maximum discharge for the whole river was not measured on any one day, but was estimated as having been 1,000,000 cubic feet per second.

DISCHARGE MEASUREMENTS.

At Head of Passes, the maximum discharge measured in any one day was 834,037 cubic feet per second, while the average discharge for the cycle of the river flood was 578,596 cubic feet per second.

Average discharge, in per cent, of the river at The Jump.

	Per cent.
The Jump	2. 87
Cubits Gap	12. 77
South Pass	11. 90
Southwest Pass	34. 50
Pass a Loutre	37. 96

Distribution of water at Head of Passes.

	Maximum.	Minimum.	Average.
	Per cent.	Per cent.	Per cent.
South Pass	16. 8	11. 2	14. 1
Southwest Pass	47. 2	35. 2	40. 9
Pass a Loutre	52. 2	39. 8	45. 0

The crevasse in Pass a Loutre was found to discharge an average of 221,672 cubic feet per second, or 16.1 per cent of the water received by Pass a Loutre.

Comparison with measurements made in 1905 and 1909 show that the discharge through Pass a Loutre remains nearly constant, while that of South Pass has gained rapidly at the expense of Southwest Pass.

APPROPRIATIONS.

Mar. 8, 1875	\$5,000.00	Fiscal year ending June 30—Con-	
May 1, 1876	2,100.28	tinued:	
Aug. 14, 1876	15,000.00	1897	\$10,000.00
Fiscal year 1878	9,400.00	1898	9,709.57
June 18, 1878	15,000.00	1899	9,878.45
Mar. 3, 1879	24,000.00	1900	9,107.87
June 14, 1880	20,000.00	1901	6,637.63
Mar. 3, 1881	10,000.00	1903	9,115.80
Aug. 2, 1882	10,000.00	1904	9,135.39
Mar. 12, 1884	6,000.00	1905	10,231.79
July 5, 1884	10,000.00	1906	11,087.14
May 26, 1886	6,492.00	1907	8,929.88
Aug. 5, 1886	10,000.00	1908	10,450.00
Mar. 30, 1888	8,800.00	1909	9,050.00
Aug. 11, 1888	10,000.00	1910	11,000.00
July 19, 1897	1,000.00	1911	10,320.00
Fiscal year ending June 30—		1912	8,680.00
1890	10,000.00	1913	11,490.00
1891	11,042.27	1914	9,375.00
1892	9,200.90	1915	10,350.00
1893	8,946.73	1916	10,195.00
1894	10,699.40		
1895	8,933.33	Total of appropria-	
1896	11,085.08	tions	417,443.51

4. LAKE PONTCHARTRAIN AND PASS MANCHAC, LA.

These works are under the charge of Mr. T. E. L. Lipsey, assistant engineer.

(A) LAKE PONTCHARTRAIN, LA.

Supervision and inspection were carried on. The ruling depth, mean low Gulf, in lake on June 30, 1916, was 7 feet, except over Middle Grounds, where there was only 5 feet. The sum of \$7.51 was expended during the year, which was for supervision and office expenses.

APPROPRIATIONS.

Previous project, Aug. 30, 1852.....	\$25, 000
Present project, June 25, 1910 (allotted July 22, 1910).....	6, 000
Total of appropriations.....	31, 000
Sept. 28, 1913, amount withdrawn and reallocated to Bayou Lacombe, La.....	500
Net total.....	30, 500

COMMERCIAL STATISTICS.

LAKE PONTCHARTRAIN, LA.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	22	160, 375	50, 000
Sailing.....	124	40, 000	.....
Motor boats.....	8	25, 000	.....
Unregistered:			
Motor boats.....	13	.....	.....
Luggers.....	38	.....	.....
Unrigged barges.....	100	.....	.....
Total.....	305	225, 375	50, 000

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Brick.....	12, 106, 200.....	30, 265	\$90, 795	25	756, 625
Charcoal.....	221, 000 barrels.....	5, 527	110, 540	25	138, 175
Clay.....	4, 350 barrels.....	870	9, 570	25	21, 750
Corn.....	4, 200 bushels.....	119	4, 165	25	2, 975
Cotton.....	272 bales.....	68	13, 600	25	1, 700
Cottonseed meal.....	972 sacks.....	49	1, 568	25	1, 225
Eggs.....	100 cases.....	3	780	25	.....
Fish.....	46 tons.....	46	9, 200	25	1, 150
Hay.....	1, 005 bales.....	40	480	25	1, 000
Junk.....	124 tons.....	124	1, 240	25	3, 100
Laths.....	4, 285, 000.....	613	17, 164	25	15, 325
Live stock.....	58 head.....	15	3, 000	25	375

Freight traffic—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Lumber.....	67,156,540 feet.....	134,313	\$1,678,912	25	3,357,625
Miscellaneous merchandise.....	25,000 tons.....	25,000	2,500,000	25	625,000
Melons.....	75,000.....	375	15,000	25	9,375
Moss.....	67 bales.....	5	250	25	125
Naval stores.....	4,056 tons.....	4,056	243,360	25	101,400
Oysters.....	50,435 barrels.....	5,043	126,075	25	126,075
Piling.....	5,928 tons.....	5,928	23,712	25	148,200
Potatoes.....	3,410 sacks.....	136	6,800	25	3,400
Rice.....	250 sacks.....	23	1,840	25	575
Sand.....	207,847 tons.....	207,847	207,847	25	5,196,175
Shells.....	59,505 tons.....	59,505	47,604	25	1,487,625
Shingles.....	616,000.....	124	3,100	25	3,100
Staves.....	48,000.....	288	7,200	25	7,200
Ties.....	5,000.....	534	6,938	25	13,350
Wood.....	10,448 cords.....	10,448	41,792	25	261,200
Total.....		491,384	5,172,532		12,284,100

It was impracticable to procure rate per ton-mile.

(B) PASS MANCHAC, LA.

The U. S. dredge *Delatour* removed several large trees from entrance into Lake Pontchartrain during March, 1916, at a cost of \$60.95. The ruling depths, mean low Gulf, in pass on June 30, 1916, were as follows: North entrance Lake Pontchartrain, 6 to 7 feet; south entrance from Lake Pontchartrain, 7 to 7.8 feet; entrance into Lake Maurepas, 8 to 10 feet. The sum of \$60.95 was expended during the year, which was for maintenance.

APPROPRIATION.

June 25, 1910 (allotted July 22, 1910)..... \$3,000

COMMERCIAL STATISTICS.

PASS MANCHAC, LA.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

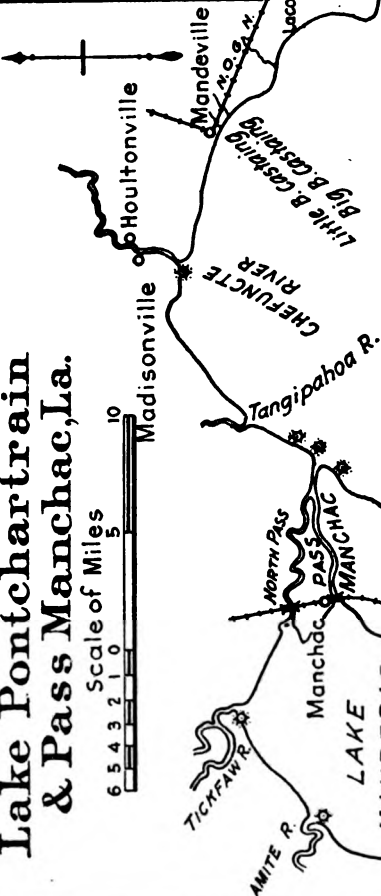
Class.	Number.	Net registered tonnage.	Passen- gers.
AMERICAN.			
Registered:			
Steamers.....	5	5,880	100
Sailing.....	14	5,452	
Gas boats.....	2	838	
Unregistered:			
Gas boats.....	2		
Unrigged barges.....	15		
Total.....	38	12,160	100

Lake Pontchartrain & Pass Manchac, La.

Scale of Miles



N



PROJECT : Lake Pontchartrain, - Re-
moval of Breakwater and obstructions
Pass Manchac - Removal of snags, logs
etc. at outlets and thru Pass.
WORK DONE PRIOR TO 1916: L. Pontchartrain
Removed breakwater and obstructions.
P. Manchac, Removed Logs, snags etc.
WORK STILL REQUIRED: Maintenance
RULING DEPTH: M. L. G. Lake Pontchar-
train 7 ft. except 5 ft. over Middle
Grounds. Pass Manchac, 7 ft.

North Draw
South Draw

West End
NEW BASIN CANAL
SPANISH FORT
BAYOU ST JOHN
Milneburg

U.S. Eng'r. Office, N.O., La.
To accompany annual report
for the Fiscal ending June 30, 1916.
Edward P. Selig
Major, Corps of Engineers, U.S.A.

NEW ORLEANS
B. Bienvenue
LAKE BORGNE
AIRE

PROJECT: *Dredging bar at mouth Chefuncte R., Dredging & removing obstructions in Chefuncte R. & B. Falia to Covington 14.5 Miles.*

WORK DONE PRIOR TO 1916:
Dredged & removed obstructions A to C.

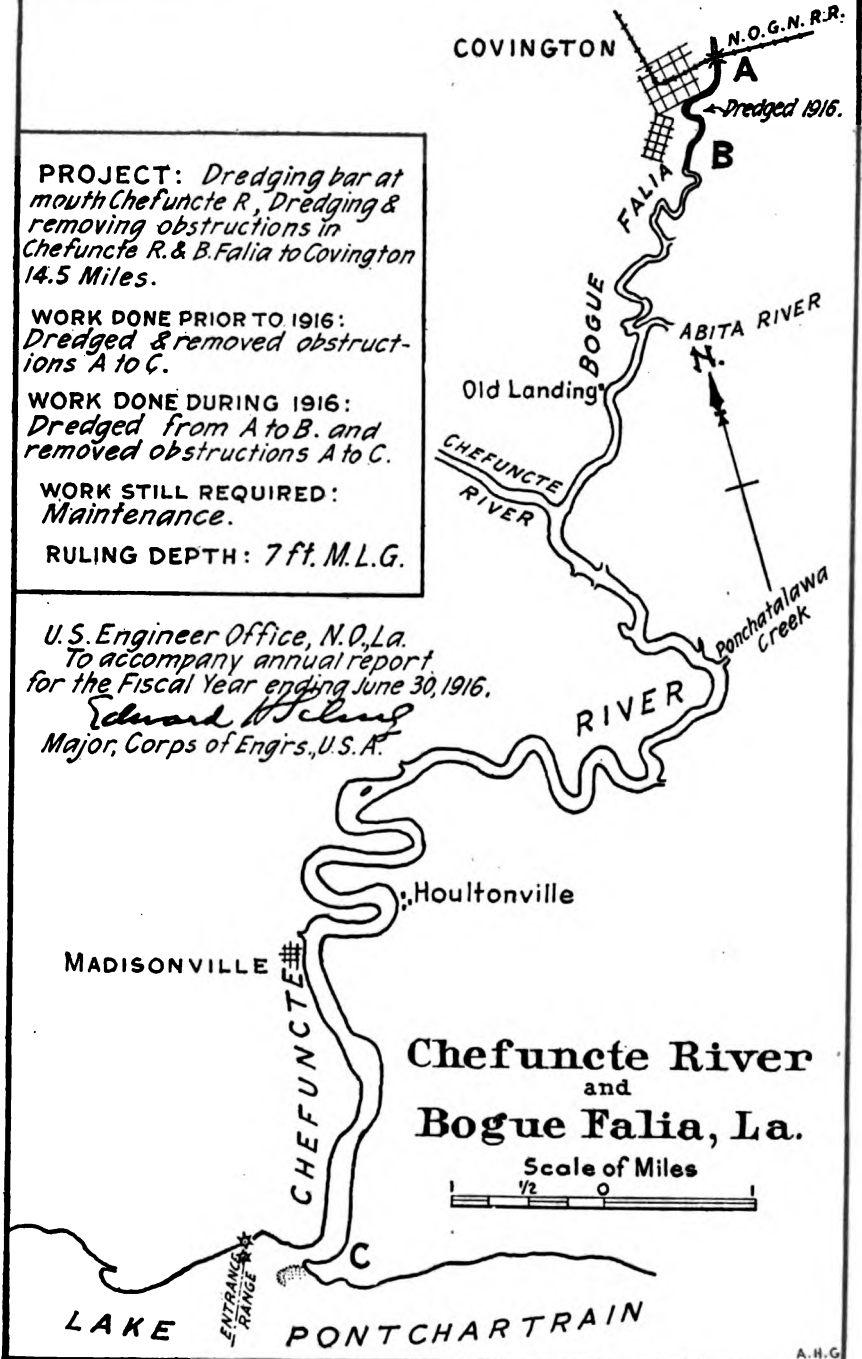
WORK DONE DURING 1916:
Dredged from A to B. and removed obstructions A to C.

WORK STILL REQUIRED:
Maintenance.

RULING DEPTH: 7 ft. M.L.G.

*U.S. Engineer Office, N.O., La.
To accompany annual report
for the Fiscal Year ending June 30, 1916.*

*Edward H. Selous
Major, Corps of Eng'rs., U.S.A.*



Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Brick.....	15,000.....	33	\$114	7	266
Corn.....	4,200 bushels.....	119	4,165	7	833
Cotton.....	117 bales.....	20	5,800	7	203
Cottonseed meal.....	972 sacks.....	49	1,568	7	343
Eggs.....	100 cases.....	3	780	7	21
Hay.....	1,005 bales.....	40	480	7	280
Laths.....	2,835,000.....	405	11,340	7	2,835
Lumber.....	12,674,000 feet.....	26,348	316,850	7	177,436
Miscellaneous merchandise.....	5,500 tons.....	5,500	550,000	7	38,500
Moss.....	67 bales.....	5	250	7	35
Piling.....	194,073 feet.....	970	3,880	7	6,790
Potatoes.....	2,717 sacks.....	108	5,400	7	755
Sand.....	3,400 barrels.....	595	595	7	4,165
Shingles.....	616,000.....	124	3,100	7	868
Staves.....	48,000.....	288	7,200	7	2,016
Ties.....	5,000.....	534	6,938	7	3,738
Wood.....	3,113 cords.....	3,113	12,452	7	21,791
Total.....		37,268	930,912	.....	260,876

It was impracticable to procure rate per ton-mile.

5. BOGUE FALIA, BAYOU MANCHAC, AMITE, CHEFUNCTE, AND TICK-FAW RIVERS, LA.

(A) CHEFUNCTE RIVER AND BOGUE FALIA, LA.

These works are under the charge of Mr. T. E. L. Lipsey, assistant engineer.

The U. S. dredge *Delatour* worked on Bogue Falia from January 26, 1916, to February 23, 1916, and from April 24, 1916, to May 6, 1916, and dredged a channel 60 feet bottom width and 7 feet deep at mean low gulf between the following points, measuring downstream from foot of Kemper Street, Covington, La.—mile 0.03 to mile 0.39; from mile 0.44 to mile 0.52; from mile 0.64 to mile 0.68; and at mile 0.8.

The dredge worked over 2,800 linear feet of channel and removed 22,263.93 cubic yards of material, at a total field cost of \$2,501.46, or 11.2 cents per cubic yard, and removed the following obstructions: Ninety-five logs, 56 trees, 1 stump, and 1 snag at a total field cost of \$164.24, or \$1.07 per obstruction. These prices include the cost of moving dredging plant from Plaquemine Lock to Covington, 190 miles; from Slidell shipyard to Covington, 40 miles; and from Covington to the Mississippi River, 67 miles.

Gauges were set along the stream.

The ruling depths, mean low gulf, over the streams on June 30, 1916, were 7 feet.

The sum of \$2,551.03 was expended during the year, which was for maintenance.

APPROPRIATIONS.

Previous projects: June 10, 1872..... \$6,000.00

Present project:

Mar. 3, 1881.....	\$1,500.00
Mar. 2, 1882.....	1,500.00
Aug. 5, 1886.....	2,500.00
Sept. 19, 1890.....	1,000.00
July 13, 1892.....	1,000.00

Present project—Continued.

Aug. 18, 1894	\$1,000.00
June 3, 1896	1,000.00
Mar. 3, 1899	1,000.00
June 13, 1902	3,000.00
Mar. 3, 1905 (allotted May 5, 1905)	500.00
Mar. 2, 1907 (allotted Apr. 8, 1907)	8,000.00
Mar. 2, 1907 (allotted Apr. 30, 1910; transferred from Amite River and Bayou Marchac, La.)	5,000.00
Mar. 3, 1909 (allotted Mar. 27, 1909)	2,000.00
June 25, 1910 (allotted July 25, 1910)	5,000.00
June 25, 1910 (allotted June 15, 1912; transferred from Tickfaw River and tributaries, La.)	1,000.00
Mar. 4, 1913 (allotted May 22, 1913)	3,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915; Mar. 26, 1916)	1,800.00
July 27, 1916 (allotted Aug. 16, 1916)	2,000.00
	\$41,800.00
Total appropriations	47,800.00
Feb. 24, 1903, amount transferred to allotment for "Improving Amite River and Bayou Manchac, La."	1,194.01
Reverted to surplus fund of Treasury	779.00
	1,973.01
Net total	45,828.99

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

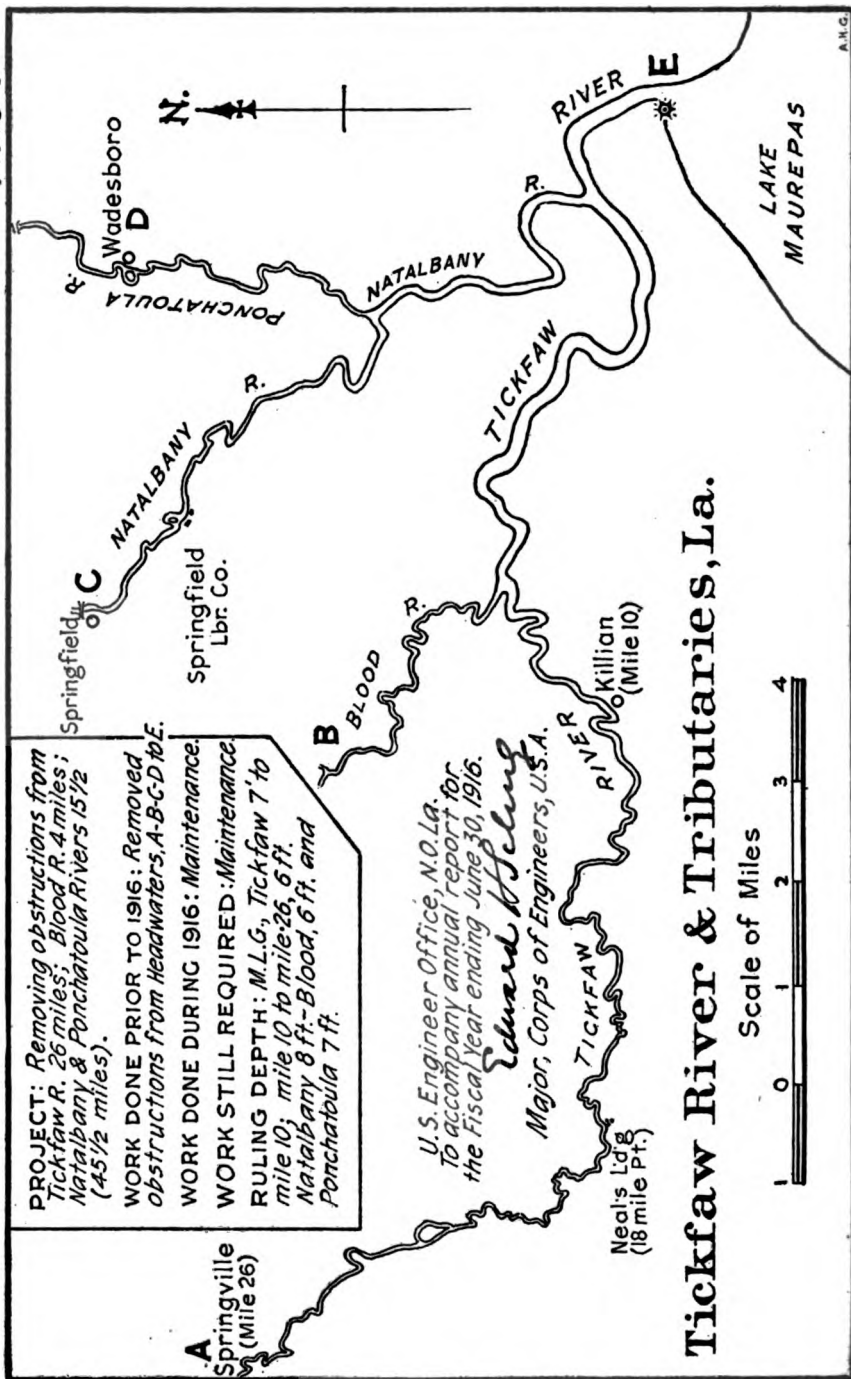
[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers	10	54,000	5,000
Sailing	18	12,857	
Unregistered:			
Motor boats	15		
Unrigged barges	45		
Total	88	66,857	5,000

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Brick	2,291,000	5,728	\$17,184	13	74,464
Charcoal	1,000 barrels	25	500	13	325
Clay	2,050 barrels	410	4,510	13	5,330
Cotton	155 bales	39	7,800	15	585
Junk	26 tons	26	260	15	390
Live stock	58 head	15	3,000	15	225
Logs	10,000,000 feet	40,000	125,000	5	200,000
Lumber	9,500,000 feet	19,000	237,500	3	57,000
Miscellaneous merchandise	7,000 tons	7,000	700,000	12	84,000
Naval stores	2,403 tons	2,403	144,180	15	36,045
Piling	3,967	4,958	19,832	5	24,790
Potatoes	557 sacks	22	1,100	5	110
Rice	250 sacks	23	1,840	3	69
Sand	202,169 tons	202,169	202,169	10	2,021,690
Wood	1,480 cords	1,480	5,920	12	17,760
Total		283,298	1,470,795		2,522,783

It was impracticable to procure rate per ton-mile.



(B) TICKFAW RIVER AND TRIBUTARIES, LA.

Supervision and inspection were carried on. The ruling depths, mean low Gulf, over these streams on June 30, 1916, were as follows: Tickfaw River, mile 0 to mile 10, 7 feet, and mile 10 to mile 26, 6 feet; Natalbany River, 8 feet; Blood River, 6 feet; and Ponchatoula River, 7 feet, mile zero being at mouth of stream in each case. The sum of \$39.44 was expended during the year, which was for supervision and office expenses.

APPROPRIATIONS.

Mar. 3, 1881	\$2,000.00
Aug. 2, 1882	2,000.00
Aug. 5, 1886	2,000.00
Aug. 11, 1888	1,000.00
Sept. 19, 1890	1,000.00
July 13, 1892	1,000.00
Aug. 18, 1894	1,000.00
June 3, 1896	1,000.00
Mar. 3, 1899	1,000.00
June 13, 1902 (allotted June 20, 1902)	1,000.00
June 13, 1902 (allotted Apr. 8, 1907; transferred from Bogue Chitto, La.)	157.46
Mar. 3, 1905 (allotted May 5, 1905)	1,000.00
Mar. 2, 1907 (allotted Apr. 8, 1907)	6,000.00
Mar. 3, 1909 (allotted Mar. 27, 1909)	2,000.00
June 25, 1910 (allotted July 25, 1910)	3,000.00
Mar. 4, 1913 (allotted May 22, 1913)	2,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)	1,000.00
July 27, 1916 (allotted Aug. 16, 1916)	1,000.00
Total of appropriations	29,157.46
June 15, 1912, amount transferred to allotment for "Improving Chefuncte River and Bogue Falia, La."	\$1,000.00
Mar. 28, 1916, amount transferred to allotment for "Chefuncte River and Bogue Falia, La"	800.00
	1,800.00
Total	27,357.46

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers	5	4,394	50
Sailing	9	3,058	
Gas boats	1	200	
Unregistered unrigged barges	10		
Total	25	7,652	50

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Brick.....	15,000.....	38	\$114	12	456
Corn.....	4,280 bushels.....	119	4,165	15	1,785
Cottonseed meal.....	972 sacks.....	49	1,568	15	735
Laths.....	2,835,000.....	405	11,340	16	6,480
Logs.....	5,832,995 feet.....	23,332	72,912	16	373,312
Lumber.....	7,350,000 feet.....	14,700	183,750	16	235,200
Miscellaneous merchandise.....	1,500 tons.....	1,500	150,000	16	24,000
Piling.....	184,073 feet.....	970	3,880	16	15,520
Shingles.....	28,000.....	6	150	14	84
Wood.....	1,115 cords.....	1,115	4,460	16	17,840
Ties.....	3,600.....	450	6,350	16	7,200
Total.....	.....	42,634	438,069	.....	682,612

It was impracticable to procure rate per ton-mile.

(C) AMITE RIVER AND BAYOU MANCHAC, LA.

The U. S. dredge *Delatour* worked on these streams from February 23, 1916, to March 24, 1916, and dredged a channel 60 feet bottom width and 7 feet deep at mean low Gulf in Bayou Manchac from mile 0 at mouth to mile 0.17. The dredge removed 9,567 cubic yards of material at a total cost of \$757.85, or 7.9 cents per cubic yard, and removed the following obstructions from Bayou Manchac from mouth to Wards Creek, and in Amite River from Bayou Manchac to Lake Maurepas: One hundred and twenty-three large trees, 362 small trees, 77 limbs, 57 stumps, 4 logs, 197 large snags, and 112 snags, at a total cost of \$1,396.32, or \$1.49 per obstruction. These prices include the cost of moving dredging plant to site of work. Gauges were set along streams.

Reexamination of streams was made on October 11 and 12, 1915, and report submitted to the department on January 22, 1916.

The ruling depths mean low Gulf over streams on June 30, 1916, were as follows: *Amite River* from mouth to mile 36—7 feet; from mile 36 to mile 41—3 to 5 feet; *Bayou Manchac* to Wards Creek—7 feet, mile zero being at mouth of stream in each case.

The sum of \$3,061.16 was expended during the year, which was for maintenance.

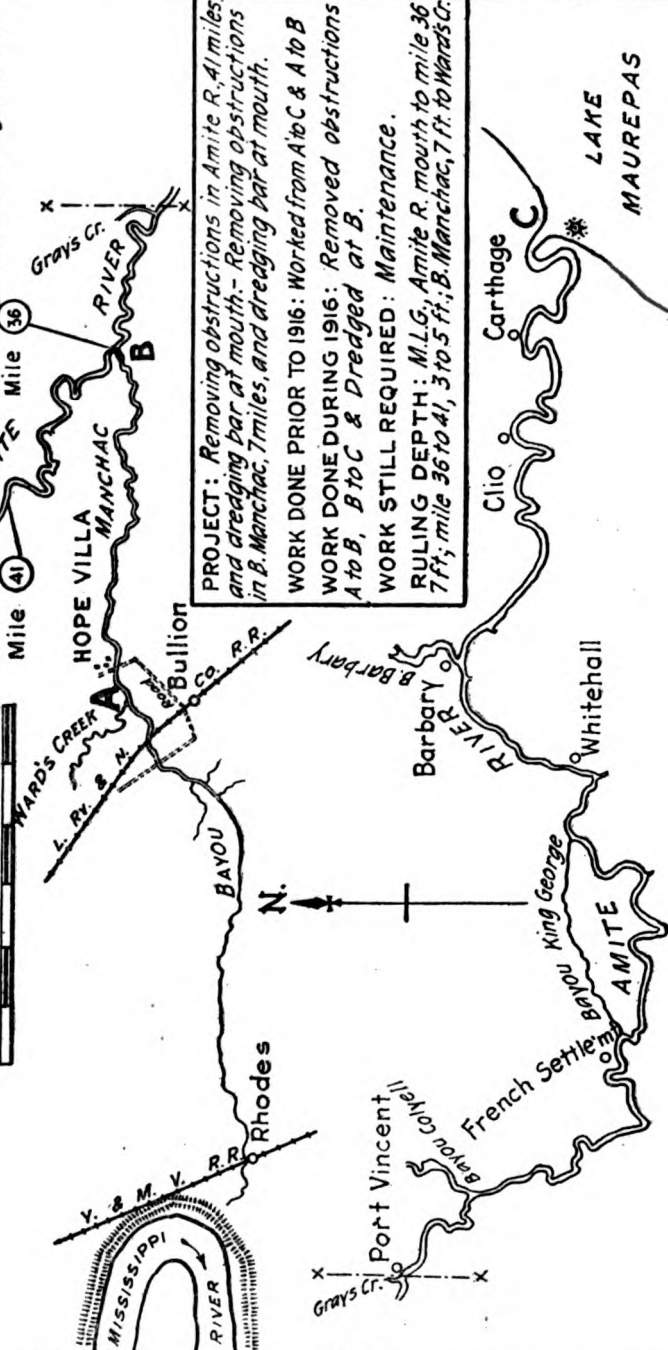
APPROPRIATIONS.

June 14, 1880.....	\$8,000.00
Mar. 3, 1881.....	5,000.00
Aug. 5, 1886.....	2,000.00
Aug. 11, 1888.....	5,000.00
Sept. 19, 1890.....	3,800.00
July 13, 1892.....	2,500.00
Aug. 18, 1894.....	2,500.00
June 3, 1896.....	2,500.00
Mar. 3, 1899.....	2,500.00
June 13, 1902 (allotted June 20, 1902).....	2,500.00
June 13, 1902 (allotted Feb. 24, 1903; transferred from Chefuncte River and Bogue Falla, La.).....	1,194.01
Mar. 3, 1905 (allotted May 5, 1905).....	5,000.00

Amite River & Bayou Manchac, La.

U.S. Eng'r Office, N.O., La.
To accompany annual report for
the Fiscal Year ending June 30, 1916.
Edward H. Schuff
Major, Corps of Eng'rs, U.S.A.

Scale of Miles



LAKE MAUREPAS

A.N.G.

RIVERS AND HARBORS—NEW ORLEANS, LA., DISTRICT. 2441

Mar. 2, 1907 (allotted Apr. 8, 1907)	\$20,000.00
Mar. 3, 1909 (allotted Mar. 27, 1909)	1,000.00
June 25, 1910 (allotted July 25, 1910)	2,000.00
Mar. 4, 1913 (allotted May 22, 1913)	2,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)	3,000.00
July 27, 1916 (allotted Aug. 16, 1916)	2,000.00

Total of appropriations	72,494.01
Apr. 30, 1910, amount transferred to allotment for "Chefuncte River and Bogue Falia, La."	5,000.00

Net total of appropriations	67,494.01
Miscellaneous receipts deposited to credit of appropriation	110.00

Grand total..... 67,604.01

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Classes.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	5	7,282	100
Sailing.....	12	2,800	
Gas boats.....	3	1,228	
Unregistered:			
Gas boats.....	6		
Unrigged barges.....	4		
Total.....	30	11,470	100

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Cotton.....	117 bales.....	20	\$5,800	45	1,305
Eggs.....	100 cases.....	3	780	35	105
Hay.....	1,005 bales.....	40	480	35	1,400
Logs.....	16,571,237 feet.....	66,285	207,140	40	2,651,400
Lumber.....	5,324,000 feet.....	10,648	123,190	20	212,980
Miscellaneous merchandise.....	4,000 tons.....	4,000	400,000	35	140,000
Moss.....	67 bales.....	5	250	20	100
Potatoes.....	2,717 sacks.....	108	5,400	35	3,780
Sand.....	3,400 barrels.....	595	595	20	11,900
Shingles.....	588,000.....	118	2,960	25	2,950
Staves.....	48,000.....	288	7,200	40	11,520
Ties.....	1,400.....	84	588	40	3,360
Wood.....	1,998 cords.....	1,998	7,992	20	39,960
Total.....		84,201	1,367,075		3,080,740

It was impracticable to procure rate per ton-mile.

6. BAYOU PLAQUEMINE, GRAND RIVER, AND PIGEON BAYOUS, LA.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer. The U. S. dredge *Grossetete* worked on this stream from January 13, 1916, to February 11, 1916, and dredged a channel 95 feet bottom width and 10 feet deep at mean low water between mile 2.8 and mile 4.2, measured downstream from the head at Plaquemine Lock, and removed 6,815 cubic yards of material at a total cost of \$738.98, or 10.8 cents per cubic yard, and removed the following obstructions from waterway: 5 logs, 6 trees, 37 stumps, 11 snags, 1 old boat bottom, and old sunken barge at mouth of Pigeon Bayou, at a total cost of \$332.84, or \$5.45 per obstruction, including two barges. This cost includes the cost of steamboat to move plant from Bayou Plaquemine to Morgan City, a distance of 64 miles, and cost of moving plant from Bayou Grossetete to site of work.

Set of logging regulations on certain streams of the waterway were approved by the department.

The ruling depths mean low Gulf of waterway on June 30, 1916, were as follows: Bay Natchez (mile 30 to mile 36), 8 feet; Flat Lake (mile 58.3 to mile 61.3), 6 feet; rest of waterway, 9 feet; Pigeon Bayous, 7 feet, miles being reckoned from Plaquemine Lock downstream.

The sum of \$9,239.89 was expended during the year, which was for maintenance, and included a pro rata share for repairs to U. S. dredge *Delatour* and equipment, \$1,427.95, and the construction of U. S. quarter boat *Choupique*, \$1,500.

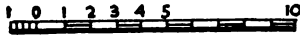
APPROPRIATIONS.

Aug. 11, 1888.....	\$100,000.00
Sept. 19, 1890.....	100,000.00
July 13, 1892.....	150,000.00
Aug. 18, 1894.....	110,000.00
June 3, 1896.....	20,000.00
June 4, 1897.....	350,000.00
Mar. 3, 1899.....	400,000.00
June 6, 1900.....	200,000.00
Mar. 3, 1901.....	210,000.00
Mar. 3, 1905.....	35,000.00
Mar. 3, 1905 (allotted June 29, 1907).....	10,000.00
June 30, 1906.....	100,000.00
Mar. 2, 1907.....	100,000.00
Mar. 2, 1907 (allotted June, 29 1907).....	10,000.00
June 29, 1907 (allotted from act of July 5, 1884).....	¹ 14,830.87
Mar. 3, 1909 (allotted Mar. 27, 1909).....	50,000.00
June 25, 1910.....	10,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	20,000.00
July 27, 1916.....	20,000.00
Total of appropriations.....	2,009,830.87
Miscellaneous receipts deposited to credit of the appropriation.....	195.27
Grand total of receipts from all sources.....	2,010,026.14

¹ Allotment of \$15,000, of which \$169.13 was returned to Treasury.

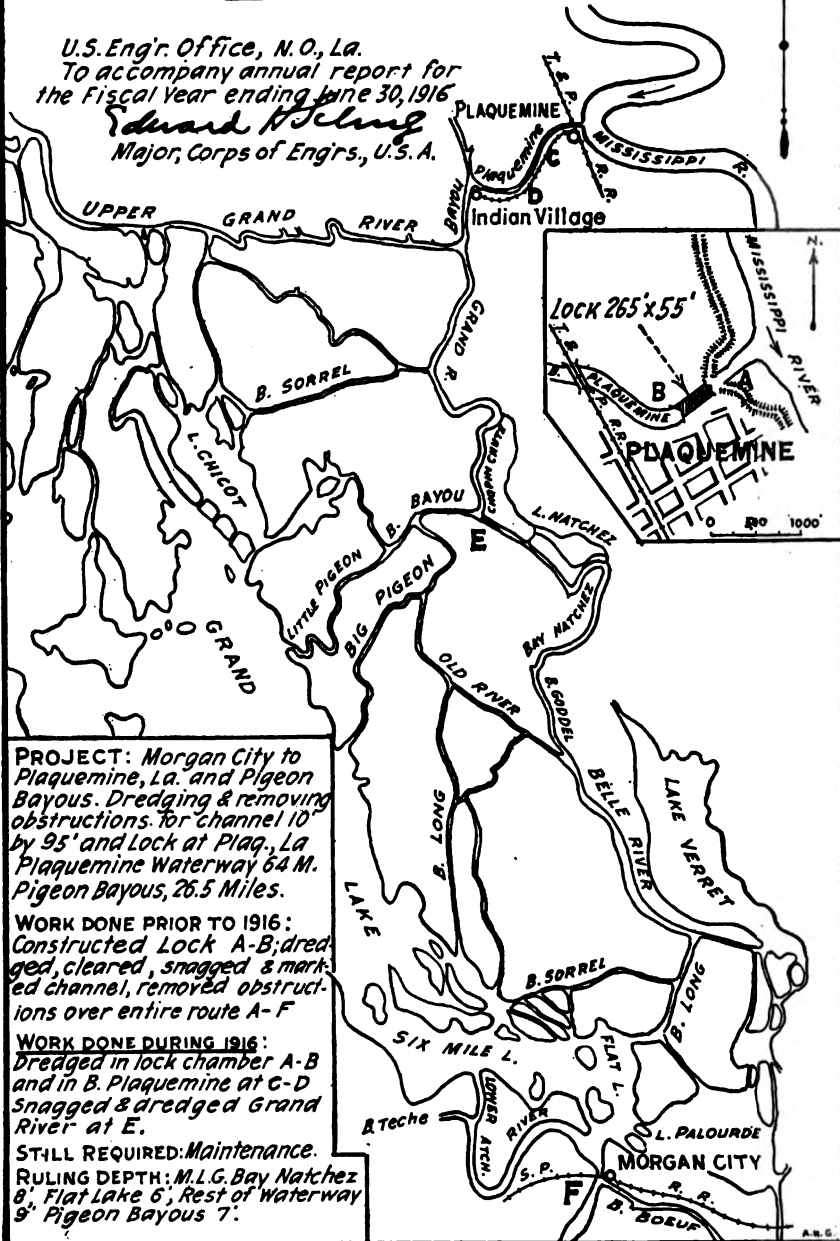
Bayou Plaquemine, La.

Scale of Miles



U.S. Eng'r. Office, N.O., La.
To accompany annual report for
the Fiscal Year ending June 30, 1916

Edward H. Selig
Major, Corps of Eng'rs., U.S. A.



COMMERCIAL STATISTICS.

BATOU PLAQUEMINE.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	37	39,536	789
Gas boats.....	84	13,264	.....
Unrigged barges.....	1	4,648	.....
Unregistered:			
Gas boats.....	106	.....	.....
Unrigged barges.....	98	.....	.....
Total.....	326	57,448	789

Freight traffic.

Article.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Brick.....	51,600.....	129	\$387	60	7,740
Cane, sugar.....	6,864 tons.....	6,864	27,456	9	61,776
Cement.....	48 tons.....	48	576	7	336
Coal.....	4,118 tons.....	4,118	16,472	60	247,080
Corn.....	1,000 bushels.....	28	980	40	1,120
Farm and dairy products.....	3,014 tons.....	3,014	904,200	40	120,560
Fish.....	633 tons.....	633	126,600	40	25,320
Feed, ground.....	1,500 sacks.....	75	2,250	40	3,000
Furs.....	3 tons.....	3	1,560	25	75
Gravel.....	39,320 tons.....	39,320	39,320	40	1,572,800
Iron and steel.....	1,432 tons.....	1,432	85,920	40	57,280
Live stock.....	38 tons.....	38	7,600	60	2,280
Lags.....	150,000,000 feet.....	600,000	1,875,000	25	15,000,000
Lumber.....	5,000,000 feet.....	10,000	125,000	20	200,000
Miscellaneous merchandise.....	42,292 tons.....	42,292	4,229,200	60	2,537,520
Molasses.....	633 tons.....	633	31,650	60	37,980
Moss.....	19,336 bales.....	1,450	72,500	60	7,000
Oats.....	3,000 bushels.....	45	1,485	40	1,800
Oil, fuel.....	15,767 tons.....	15,767	126,136	60	946,020
Oysters.....	378 tons.....	378	9,450	60	22,680
Potatoes.....	898 barrels.....	78	3,900	60	4,680
Rice.....	722 tons.....	722	57,760	60	43,320
Sand.....	307 tons.....	307	307	60	18,420
Shingles.....	39,000.....	6	150	30	180
Staves.....	219,801.....	1,319	32,970	30	39,570
Sugar.....	3,543 tons.....	3,543	283,440	60	212,580
Wood, cord.....	5,900 cords.....	5,900	23,600	60	354,000
Total.....		738,142	8,085,899	.....	21,605,117

It was impracticable to procure rate per ton-mile.

7. OPERATING AND CARE OF PLAQUEMINE LOCK, BAYOU PLAQUEMINE, LA.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer, with Mr. A. E. Fugler, jr., inspector, in local charge.

The operation of the lock throughout the year has been satisfactory. The U. S. dredge *Delatour* worked on dredging in bayou approach and in lock chamber from December 29, 1915, to January 18, 1916, removing in bayou approach 16,316 cubic yards and in lock chamber 8,700 cubic yards of material at a total field cost of \$1,481.97, or 5.9 cents per cubic yard, including cost of moving plant from Morgan City, a distance of 64 miles. This material was placed on lock reservation on north side of lock.

Contractor's dredge *J. W. Thompson* worked on dredging in Mississippi River approach and in lock chamber from November 15 to 24, 1915, removing 16,787 cubic yards of material at a total cost of \$1,745.31, or 10.4 cents per cubic yard. This material was placed in Mississippi River.

Partially painted the lock gates; placed steel superstructure on lock gates during high water in Mississippi River, closing down the lock from February 29 to March 6, 1916. Extreme high water was 39.85 feet above low Gulf. Lock gauge reading 49; Mississippi River Commission gauge reading 38.4, Cairo datum. Raised levees around north side of lock reservation, \$172; built fence around same, \$350; partially constructed storehouse at an estimated cost of \$2,500; screened powerhouse, \$65; repaired windows and doors to office of powerhouse, \$75, and minor numerous repairs to buildings, etc.; worked on design for shipways at lock; and printed and published set of rules and regulations governing the operation of lock. The following work was done by hired labor at lock: Constructed two working skiffs for dredge *Grossetete*, cost \$23.05; constructed two motor skiffs for survey boat *Intracoastal*, cost \$32.87; constructed two extension tables for survey boat *Intracoastal*, cost \$11.80; made a map file case for office, cost \$9.20; constructed six wooden pontoons for dredge *Delatour*, cost \$845.19, and made certain repairs to launch *Salvador's* boathouse.

Gauge records.—The maximum and minimum difference of level between the Mississippi River and Bayou Plaquemine at the lock for each month of the fiscal year are shown in the following table:

Date.	Maximum.			Minimum.		
	River gauge.	Bayou gauge.	Difference.	River gauge.	Bayou gauge.	Difference.
1915.						
July.....	37.6	18.9	18.7	35.3	18.0	17.3
August.....	35.3	18.0	17.3	30.9	17.3	13.6
September.....	36.1	18.0	18.1	30.5	17.2	13.3
October.....	29.3	18.0	11.3	24.6	15.9	8.7
November.....	24.0	18.0	6.0	16.0	13.6	2.4
December.....	30.2	18.9	11.3	20.9	14.0	6.9
1916.						
January.....	42.4	19.2	23.2	31.1	15.6	15.5
February.....	48.8	19.9	28.9	42.8	19.4	23.4
March.....	49.0	20.1	28.9	40.7	19.4	21.3
April.....	40.5	19.4	21.1	37.0	18.7	18.3
May.....	40.8	19.5	21.3	33.6	18.8	14.8
June.....	34.7	18.8	15.9	31.6	17.7	13.9

EXPENDITURES.

During the fiscal year there was expended \$17,528.80 for operating and care, as follows:

(a) Salaries and wages for regular hired force.....	\$6,930.22
(b) Miscellaneous supplies and services.....	2,770.70
(c) Miscellaneous repairs to lock, buildings, etc.....	508.16
(d) Dredging approaches to and inside of lock.....	3,003.38
(e) Contingencies.....	4,316.34
Total.....	17,528.80

Amounts expended under allotments, act March 3, 1909:

Fiscal year 1910.....	\$18,789.28
Fiscal year 1911.....	23,471.81
Fiscal year 1912.....	14,706.75
Fiscal year 1913.....	27,048.88
Fiscal year 1914.....	13,461.80
Fiscal year 1915.....	23,092.12
Fiscal year 1916.....	17,528.80
Total.....	138,048.89

CONTRACT IN FORCE.

I.

Name and address of contractor: Robt. P. Hyams Coal Co. (Ltd.), New Orleans, La.

Work: Furnishing and delivering coal in bunkers of dredges at New Orleans and on barge or boat belonging to contractor at Port Eads of Burrwood, La., or in Bayou Plaquemine just below United States lock.

See III of abstract of contracts for Southwest Pass, Mississippi River.

COMMERCIAL STATISTICS.

Lockages made and traffic passed at Plaquemine Locks during the calendar year ended Dec. 31, 1915.

Lockages.....	1,374	Barges.....	621
Steamboats.....	358	Other crafts.....	426
Motor boats.....	1,192	Passengers.....	789

Freight traffic.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Brick.....	4	\$12	Molasses.....	633	\$31,660
Cement.....	48	576	Oil, fuel.....	15,767	126,136
Coal.....	4,118	16,472	Oysters.....	206	5,150
Farm and dairy products.....	3,014	904,200	Rice.....	686	54,830
Gravel.....	39,320	39,320	Sand.....	307	307
Iron and steel products.....	1,432	85,920	Sugar.....	3,463	277,040
Live stock.....	38	7,600	Timber, logs.....	22,469	70,216
Lumber.....	653	8,162			
Miscellaneous.....	760	114,000	Total.....	99,746	2,424,441
Miscellaneous merchandise.....	6,828	682,800			

8. BAYOU GROSSETETE, LA.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer.

The U. S. dredge *Grossetete* worked on this stream from July 1, 1915, to January 13, 1916, and dredged a channel 40 feet bottom width and 5 feet deep at mean low water from mile 10.55 above mouth to mile 29, the limit of improvement, and then worked from this point to the mouth. The dredge removed 85,125 cubic yards of material, 1,276 snags, 329 stumps, 80 sinkers, 179 logs, 326 trees, and 110 piling, at a total field cost of \$7,196.37, or 8.45 cents per cubic yard, including the removal of obstructions.

On July 12, 1915, the dredge struck a snag and sank just below mile 11; was raised on July 19, 1915, and began work again on July 22, 1915. Total cost of raising, \$819.70, which, if cost is included in dredging, will make cost per cubic yard, 9.41 cents.

Under formal agreement, 386 logs (68,583 feet b. m.) were removed.

The ruling depth over stream on June 30, 1916, was 5 feet, mean low water from mile 0 to mile 29, mile zero being at mouth of stream. Mile boards and gauges were placed over the entire stream.

The sum of \$10,881.21 was expended during the year for improvement, and includes a pro rata share of construction of the U. S. quarter boat *Choupique*, \$500.

APPROPRIATIONS.

July 25, 1912.....	\$18,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	9,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	3,000.00
July 27, 1916.....	5,000.00
Total of appropriations.....	35,000.00
Miscellaneous receipts deposited to credit of appropriation.....	151.26
Total receipts from all sources.....	35,151.26

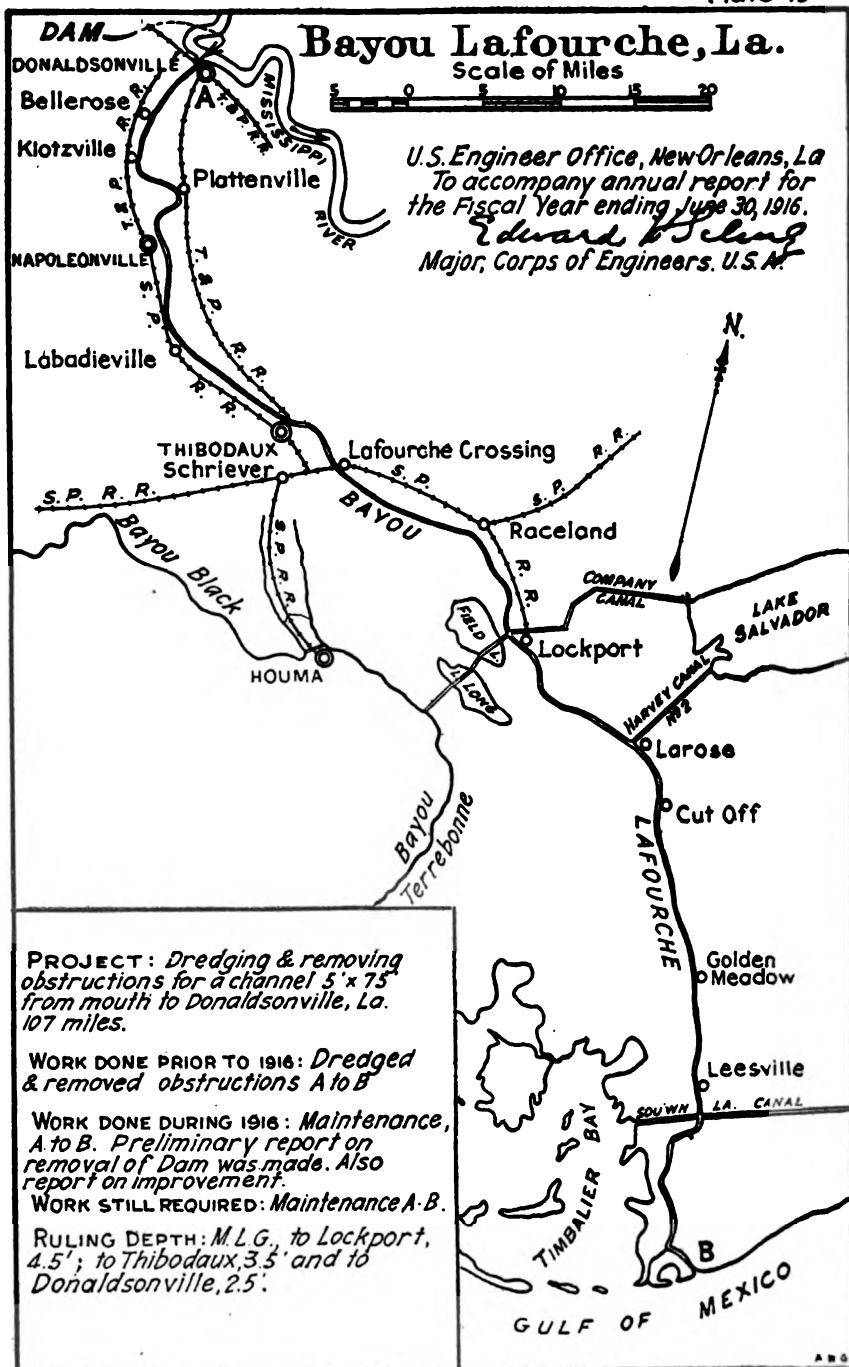
COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.
AMERICAN.		
Registered:		
Steamers.....	5	7,440
Gas boats.....	6	9,000
Unregistered:		
Gas boats.....	7	.....
Unrigged barges.....	20	.....
Total.....	38	16,440



Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Cane.....	1,747 tons.....	1,747	\$6,988	3	5,241
Feed.....	500 tons.....	500	15,000	25	12,500
Gravel.....	6,600 tons.....	6,600	6,600	20	132,000
Logs.....	21,970,586 feet.....	127,882	\$99,632	20	2,557,640
Lumber.....	1,000,000 feet.....	2,000	25,000	20	40,000
Miscellaneous merchandise.....	1,000 tons.....	1,000	100,000	20	20,000
Moss.....	3,900 bales.....	293	14,650	20	5,860
Potatoes.....	1,200 barrels.....	105	5,250	40	4,200
Rice.....	400 sacks.....	36	2,880	40	1,440
Staves.....	40,272.....	101	60,408	20	2,020
Sugar.....	400 barrels.....	80	6,400	40	3,200
Wood.....	2,000 cords.....	2,000	8,000	20	40,000
Total.....		142,344	650,808		2,524,101

It was impracticable to procure rate per ton-mile.

9. BAYOU LAFOURCHE, LA.

This work is under charge of Mr. T. E. L. Lipsey, assistant engineer. Supervision and inspection were carried on during the year. The bayou has been closed off from the Mississippi River by a temporary dam at its head; authority to do this having been granted by Congress on June 30, 1902, to the Atchafalaya and Lafourche levee boards, pending the construction of a lock. The time for the construction of a lock was extended by acts of June 13, 1904, March 2, 1907, and March 4, 1915. The limit set by the last act is July 1, 1917. The matter was still in abeyance on June 30, 1916. Dredging since 1902 has been done by the two levee boards aforesaid as a condition of the permission to construct a temporary dam.

Inspection was made of proposed lock site in connection with examination relative to cooperation of the United States in construction of the lock, and a public hearing was held at Donaldsonville, La., November 23, 1915.

A report on preliminary examination with a view to improvement and to construction of lock at head of bayou was submitted on May 31, 1916. Report on lock plans by the joint organization of levee boards is held pending action on preliminary report above dated. The ruling depths of stream at mean low Gulf, on June 30, 1916, were: To Lockport, 4.5 feet; to Thibodaux, 3.5 feet; and Donaldsonville, 2.5 feet. The sum of \$69.64 was expended during the year, which was for supervision and office expenses.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 475) --- \$32,500.00
Present project:

Aug. 11, 1888.....	\$50,000.00
Sept. 19, 1890.....	50,000.00
July 13, 1892.....	50,000.00
Aug. 18, 1894.....	40,000.00
June 3, 1896.....	25,000.00
Mar. 3, 1899 (maintenance).....	7,500.00
June 13, 1902 (maintenance).....	7,500.00

2448 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Present project—Continued.

June 25, 1910 (maintenance)-----	\$7, 500. 00
Mar. 4, 1913 (maintenance)-----	2, 000. 00
	<u>\$239, 500. 00</u>
Total of appropriations-----	272, 000. 00
June 30, 1909, amount reverted to surplus fund of Treasury-----	1, 914. 83
Net total-----	270, 085. 17
Miscellaneous receipts deposited to credit of appropriation-----	26. 40
Grand total-----	<u>270, 111. 57</u>

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

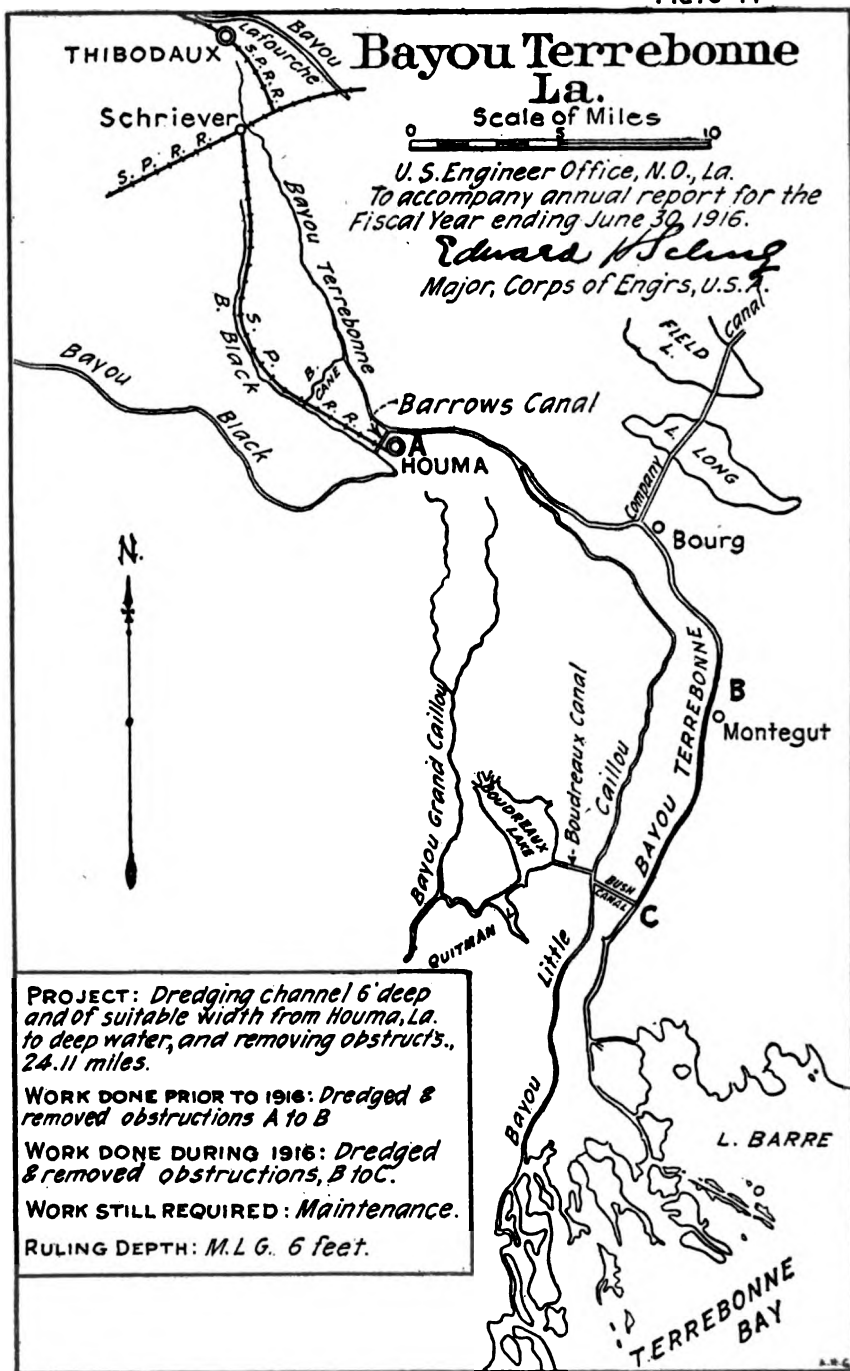
[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	8	78, 289	1, 926
Gas boats.....	13	15, 000	.....
Unregistered:			
Gas boats.....	25	.....	.....
Unrigged barges.....	100	.....	.....
Total.....	146	93, 289	1, 926

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Brick.....	10,800.....	25	\$75	20	500
Cane, sugar.....	96,667 tons.....	96,667	382,668	30	2,870,010
Coal.....	450 tons.....	450	1,800	6	2,700
Corn.....	68,210 bushels.....	1,909	66,815	20	38,180
Eggs.....	3,500 cases.....	106	27,300	30	3,150
Feed, ground and grain.....	3,000 tons.....	3,000	90,000	30	90,000
Fertilizer.....	337 tons.....	337	11,468	10	3,370
Furs.....	1 ton.....	1	530	40	40
Gravel.....	50 tons.....	50	60	15	750
Hides.....	2,400.....	60	6,000	10	1,200
Laths.....	91,000.....	13	364	20	130
Lime.....	700 barrels.....	70	700	30	2,100
Live stock.....	1,700 head.....	425	85,000	20	8,500
Lumber.....	11,640,780 feet.....	46,563	145,500	20	931,260
Machinery.....	3,985,000 feet.....	7,970	99,625	10	79,700
Molasses.....	270 tons.....	270	27,000	10	2,700
Mosses.....	15,235 barrels.....	4,951	247,560	6	29,708
Moss.....	3,500 bales.....	283	13,150	10	2,830
Miscellaneous merchandise.....	15,000 tons.....	15,000	1,500,000	25	375,000
Onions.....	70,000 sacks.....	2,450	98,000	30	49,000
Oats.....	65,000 bushels.....	975	32,175	20	19,500
Oil, fuel.....	254,681 barrels.....	39,475	315,800	35	1,381,625
Oil, refined.....	9,691 barrels.....	1,938	63,954	35	67,830
Potatoes.....	71,186 sacks.....	2,847	142,350	20	56,940
Poultry.....	1,000 coops.....	25	7,000	40	1,000
Rice.....	5,000 sacks.....	450	36,000	25	11,250
Shingles.....	2,138,000.....	428	10,700	9	3,852
Sugar.....	37,836 barrels.....	7,567	605,360	24	181,608
Ties.....	148,054.....	8,883	62,181	10	88,830
Total.....		148,167	4,079,114	.....	6,303,061

It was impracticable to procure rate per ton-mile.



10. BAYOU TERREBONNE, LA.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer. The U. S. dredge *Delatour* worked on this stream from July 1, 1915, to December 10, 1915, and dredged a channel 50 feet bottom width and 6 feet deep at mean low Gulf from mile 14.87 below the St. Louis Cypress Co.'s bridge in Houma, La., to Bush Canal, mile 24.11, the end of improvement. The 50-foot bottom width is slightly restricted at some of the bridges.

The dredge removed 438,843 cubic yards of material, 23 snags, 80 piling, 19 logs, 6 trees, and 1 large tank at a total field cost of \$17,826.92, or 4.06 cents per cubic yard including the removal of obstructions.

Constructed 6 pontoons for U. S. dredge *Delatour* at a cost of \$845.19. Mileposts and gauges were placed over the entire stream. A set of logging regulations were approved by the department.

The ruling depth over stream on June 30, 1916, was 6 feet mean low Gulf from mile 0 to mile 24.11, miles being reckoned from St. Louis Cypress Co.'s bridge in Houma, La., downstream.

The sum of \$28,180.05 was expended during the year, which was for improvement, and included a prorata share for repairs to U. S. dredge *Delatour* and equipment, \$1,427.95.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 566) - \$47,222.78

Present project:

June 25, 1910.....	\$25,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914).....	25,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915).....	15,000.00	
Mar. 4, 1915 (allotted Sept. 27, 1915).....	10,000.00	
July 27, 1916.....	8,000.00	
		78,000.00
Total of appropriations.....		125,222.78
Amount reverted to the surplus fund of Treasury.....		158.90
Net total of appropriations.....		125,063.88
Miscellaneous receipts deposited to credit of appropriation.....		44.61
Total receipts from all sources.....		125,108.44

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered.			
Steamers.....	7	35,000	1,500
Gas boats.....	12	23,800	
Unregistered:			
Gas boats.....	375		
Unrigged barges.....	150		
Total.....	544	58,800	1,500

¹ The allotments from the act of Mar. 3, 1905, amounted to \$10,000, of which \$1,577.27 was returned to the Treasury to the credit of the appropriation.

Freight traffic.

Article.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Brick.....	10,000.....	25	\$75	15	375
Cane, sugar.....	38,272 tons.....	38,272	153,088	15	574,080
Cement.....	2,000 barrels.....	400	4,800	16	6,400
Coal.....	500 tons.....	500	2,000	15	7,500
Corn.....	6,000 bushels.....	168	5,880	15	2,520
Cooperage.....	200 tons.....	200	3,300	15	3,000
Eggs.....	500 cases.....	15	3,900	30	450
Feed, ground and grain.....	6,175 tons.....	6,175	186,250	15	92,625
Fertilizer.....	1,550 tons.....	1,550	52,700	20	31,000
Furs.....	1 ton.....	1	530	30	300
Fish.....	157 tons.....	157	31,400	40	6,280
Gravel.....	200 tons.....	200	200	15	3,000
Hides.....	53 tons.....	52	5,225	30	1,560
Junk.....	625 tons.....	625	6,250	15	9,375
Lime.....	500 barrels.....	50	500	20	1,000
Live stock.....	600 head.....	150	30,000	10	1,500
Logs.....	15,604,300 feet.....	62,417	195,054	12	749,004
Lumber.....	200,000 feet.....	400	5,000	30	12,000
Machinery.....	395 tons.....	395	39,500	15	5,925
Miscellaneous merchandise.....	10,000 tons.....	10,000	1,000,000	16	160,000
Molasses.....	21,600 barrels.....	7,020	351,000	10	70,200
Moss.....	2,250 bales.....	169	8,450	40	6,760
Naval stores.....	30 tons.....	30	1,800	16	480
Oats.....	10,000 bushels.....	150	4,950	15	2,250
Oil, fuel.....	50,387 barrels.....	7,809	62,472	30	234,270
Oil, refined.....	2,000 barrels.....	400	13,200	30	12,000
Oysters.....	4,251 tons.....	4,251	106,275	40	170,040
Piling.....	40 piles.....	50	200	16	800
Potatoes.....	15,000 barrels.....	1,312	65,600	30	39,360
Rice.....	10,700 sacks.....	963	77,040	10	9,630
Salt.....	125 tons.....	125	375	15	1,875
Sugar.....	14,150 tons.....	14,150	1,132,000	15	212,250
Shrimp.....	636 tons.....	636	30,000	50	31,800
Ties, cypress.....	4,486.....	24	168	16	384
Total.....		158,841	3,578,182	.....	2,450,723

It was impracticable to procure rate per ton-mile.

11. ATCHAFALAYA RIVER FROM MORGAN CITY, LA., TO THE GULF OF MEXICO.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer. The U. S. dredge *Gulfport* worked on this channel from July 1, 1915, to July 30, 1915, and dredged a channel 200 feet bottom width and 18 feet deep at mean low Gulf between mile 0.19 and mile 4.09, and mile 7.23 and mile 9.02, being 5.89 miles, and removed 1,042,030 cubic yards of material, at a total cost of \$12,434.20, or 1.19 cents per cubic yard, including transportation to and dismantling of plant at Pascagoula, Miss. Mile 0 is taken at beginning of channel, about 4 miles from mouth of Atchafalaya River. Survey of channel was made on September 3, 1915, which showed about 4 feet of shoaling. A set of logging regulations for this stream and tributary streams thereto in vicinity of Morgan City was approved and published. The ruling depth, mean low Gulf, in this channel on June 30, 1916, was 11.5 feet at about mile 9.09. The sum of \$22,926.52 was expended during the year, which was for maintenance.

APPROPRIATIONS.

June 25, 1910.....	\$540,000
Oct. 2, 1914 (allotted Oct. 7, 1914).....	10,000
Mar. 4, 1915 (allotted Apr. 2, 1915).....	20,000
July 27, 1916.....	50,000
Total.....	620,000

COMMERCIAL STATISTICS.

IMPROVING ATCHAFALAYA RIVER, LA., FROM MORGAN CITY TO THE GULF OF MEXICO.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	35	62,000	2,250
Gas boats.....	15	10,410	.....
Sailing.....	18	30,690	.....
Unrigged barges.....	3	14,016	.....
Unregistered:			
Gas boats.....	25	.....	.....
Unrigged barges.....	50	.....	.....
Total.....	146	117,116	2,250

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
<i>Miles.</i>					
Brick.....	30,000.....	75	\$225	35	2,625
Cane, sugar.....	6,864 tons.....	6,864	27,426	5	34,320
Cement.....	250 barrels.....	50	600	20	1,000
Corn.....	6,260 bushels.....	174	6,080	10	1,740
Cottonseed meal.....	150 tons.....	150	4,800	25	3,750
Feed, ground and grain products.....	810 tons.....	810	24,300	10	8,100
Fertilizer.....	3,020 tons.....	3,020	102,680	25	75,500
Fish.....	577 tons.....	577	115,400	30	17,310
Flour.....	3,000 barrels.....	294	15,000	10	2,940
Furs.....	378,500.....	95	50,350	30	2,850
Grease.....	4 tons.....	4	400	25	100
Gravel.....	27,390 tons.....	27,390	27,390	30	821,700
Hay.....	75 tons.....	75	900	10	750
Hides.....	10,000.....	50	5,000	30	1,500
Ice.....	500 tons.....	500	3,000	20	10,000
Iron and steel.....	20 tons.....	20	1,200	25	500
Lime.....	2,500 barrels.....	250	2,500	5	1,250
Live stock.....	85 head.....	21	4,200	5	105
Logs.....	107,576,232 feet.....	430,305	1,344,703	25	10,757,625
Lumber.....	12,830,752 feet.....	25,661	326,769	20	513,220
Miscellaneous merchandise.....	14,000 tons.....	14,000	1,400,000	10	140,000
Molasses.....	6,284 barrels.....	2,542	127,100	5	12,710
Moss.....	3,750 bales.....	281	14,050	30	8,430
Oats.....	5,800 bushels.....	87	2,871	10	870
Oil, fuel.....	172,257 barrels.....	28,699	213,592	8	213,592
Oil refined.....	10,771 barrel.....	2,154	71,082	8	17,232
Oysters.....	2,000 tons.....	2,000	50,000	30	60,000
Potatoes.....	1,760 barrels.....	154	7,700	10	1,540
Rice.....	3,700 sacks.....	333	26,640	8	2,664
Shrimp.....	50 tons.....	50	5,000	20	1,000
Salt.....	75 tons.....	75	225	30	2,250
Slabs, wood.....	1,500 cords.....	2,250	1,688	25	56,250
Sugar.....	14,765 barre.....	2,953	236,240	5	14,765
Ties.....	21,400 pieces.....	2,247	15,729	15	33,705
Wood, cord.....	6,300 cords.....	6,300	25,200	15	94,500
Total.....		558,510	4,254,050	.....	12,916,393

It was impracticable to procure rate per ton-mile.

ATCHAFALAYA RAY SHIP CHANNEL.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Fish.....	158 tons.....	158	\$31,000
Ice.....	172 tons.....	172	1,032
Lumber.....	12,430,783 feet.....	24,861	310,792
Miscellaneous merchandise.....	1,000 tons.....	1,000	100,000
Oil, fuel.....	81,423 barrels.....	12,620	100,980
Oysters.....	750 tons.....	750	18,750
Total.....		30,561	568,104

12. BAYOU TECHE, LA.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer. Contract was let on June 12, 1915, to Southern Dredging Co., Mobile, Ala., for dredging a channel 50 feet wide at bottom and 6 feet deep at mean low water from mile 3.13 below Keystone Lock downstream as far as funds would permit. The amount available is about \$30,000.

The dredge *Pittsburg* began dredging under this contract on September 7, 1915, at mile 3.13 below Keystone Lock and was removed on October 24, 1915. The dredge *A. G. Thomas* began dredging on January 11, 1916, and was removed on February 1, 1916. The dredge *Pittsburg* began dredging on February 8, 1916. The dredge *A. G. Thomas* was again placed on work on April 28, 1916, and at end of fiscal year both dredges were working. The dredging has been done from mile 3.13 to mile 10.04, and completed and estimated for 36,450 linear feet of channel as per contract, involving 203,610 cubic yards of material, at a contract cost of 7.8 cents per cubic yard.

The U. S. dredge *Grossetete* worked on this stream from February 29, 1916, to May 20, 1916, and dredged a channel 50 feet wide on bottom and 6 feet deep at mean low water from mile 18.53 above Keystone Lock to mile 22.63 and 40 feet wide on bottom and 6 feet deep at mean low water from mile 22.63 to mile 26 and removed 49,377 cubic yards of material, at a total field cost of \$2,761.25, or 5.5 cents per cubic yard, and removed the following obstructions from Keystone Lock to mile 26: Two hundred stumps, 138 snags, and 11 trees, at a total cost of \$404.95, or \$1.16 per obstruction. These prices include the cost of moving plant from Morgan City to site of work, 101 miles, and from mile 26 to Keystone Lock, 26 miles. Gauges were set along the stream.

A set of logging regulations were gotten up, approved, and published. The ruling depths, mean low water, on June 30, 1916, are as follows: To Franklin, 8 feet; to New Iberia, 5 feet; New Iberia to mile 10.04 below Keystone Lock, 4 feet; mile 10.04 below lock to mile 26 above lock, 6 feet; and mile 26 above lock to Arnaudville, 4 feet.

The improvement was considered completed March 31, 1916. During the fiscal year there were expended \$6,444.19 for improvement, \$10,964.24 for maintenance; a combined total of \$17,408.43.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 563) - \$50,700.00

Present project:

Sept. 19, 1890.....	\$5,000.00
Aug. 18, 1894.....	6,000.00
June 3, 1896.....	10,000.00
Mar. 3, 1899.....	10,000.00
June 13, 1902.....	7,500.00
Mar. 3, 1905.....	7,500.00
Mar. 2, 1907.....	130,000.00
June 25, 1910.....	50,000.00
Feb. 27, 1911.....	60,000.00
Mar. 2, 1907 (allotted Jan. 11, 1908).....	500.00
Mar. 3, 1909 (allotted Mar. 26, 1909).....	5,000.00
July 25, 1912.....	60,000.00
Mar. 4, 1913.....	40,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	30,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	10,000.00
July 27, 1916.....	10,000.00
	<hr/> 441,500.00
Total of appropriations.....	492,200.00
Amounts reverted to surplus fund of the Treasury.....	5,022.48
	<hr/>
Net total of appropriations.....	487,177.52
Miscellaneous receipts deposited to credit of the appropriation.....	622.58
	<hr/>
Grand total.....	487,800.10

CONTRACT IN FORCE.

Name and address of contractor: Southern Dredging Co., Mobile, Ala.

Work: Dredging in Bayou Teche, between Keystone Lock and Jeanerette, La.

Contract price: 7.8 cents per cubic yard.

Date of contract: June 12, 1915.

Date of approval: July 1, 1915.

Date of commencement: October 10, 1915.

Date set for completion: October 16, 1916.

Percentage of completion at end of fiscal year: 52 per cent.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	26	82,000	500
Gas boats.....	12	15,000	.....
Unregistered:			
Gas boats.....	25	.....	.....
Unrigged barges.....	75	.....	.....
Total.....	138	97,000	500

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Brick.....	15,000	38	\$114	18	684
Cane, sugar.....	35,000 tons	35,000	140,000	20	700,000
Cement.....	2,000 barrels	400	4,800	20	8,000
Coal.....	1,850 tons	1,850	5,400	40	54,000
Corn.....	15,000 bushels	504	17,640	40	20,160
Farm and dairy products.....	50 tons	50	15,000	40	2,000
Feed, ground, and grain products.....	10,000 tons	10,000	300,000	40	400,000
Fertilizer.....	3,408 tons	3,408	115,804	40	136,940
Grease.....	4 tons	4	400	40	160
Hay.....	100 tons	100	1,200	40	4,000
Gravel.....	27,390 tons	27,390	27,390	40	1,095,600
Iron and steel.....	13 tons	13	780	50	650
Live stock.....	50 head	13	2,000	30	390
Logs.....	57,045,648 feet	348,182	1,088,070	40	13,927,280
Lumber.....	1,300,000 feet	2,400	30,000	40	96,000
Machinery.....	750 tons	750	75,000	40	30,000
Miscellaneous merchandise.....	30,000 tons	30,000	3,000,000	40	1,200,000
Molasses.....	7,700 barrels	2,502	125,109	30	75,060
Oats.....	10,800 bushels	162	5,346	40	6,480
Oil, fuel.....	175,625 barrels	26,911	215,288	50	1,345,550
Oil, refined.....	2,702 barrels	540	17,820	50	27,000
Oysters.....	100 tons	100	2,500	75	7,500
Potatoes.....	4,050 barrels	354	17,700	40	14,160
Rice.....	30,273 sacks	2,725	215,000	40	109,000
Salt.....	250 tons	250	750	40	10,000
Sugar.....	39,001 barrels	7,800	624,080	40	312,000
Shingles.....	300,000	80	1,500	40	2,400
Ties.....	2,247	134	938	40	5,380
Wood, cord.....	9,557 cords	9,557	38,228	40	382,280
Total.....		510,695	6,081,468	.....	19,971,964

It was impracticable to procure rate per ton-mile.

18. OPERATING AND CARE OF KEYSTONE LOCK, BAYOU TECHE, LA.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer. The operation of the lock throughout the year has been satisfactory. Repaired and painted all lock buildings, filled in portions of esplanade area and placed cement walks around same; planted trees around reservation and fenced in reservation on west side, at a cost of \$100; installed ladders and placed life buoys on lock walls; cleaned and painted all ironwork of lock, and built small set of shipways; printed and published a set of rules and regulations governing operation of lock; constructed by hired labor dynamite pontoon for dredge *Grossetete*, cost \$74.20.

Gauge records.—The maximum and minimum differences of level between upper and lower pools at the lock for each month for the fiscal year as shown in the table following.

Date.	Maximum.			Minimum.		
	Upper pool.	Lower pool.	Difference.	Upper pool.	Lower pool.	Difference.
1915.						
July.....	10.1	10.0	0.1	8.10	1.4	6.70
August.....	8.7	5.45	3.25	8.1	1.4	6.70
September.....	8.6	2.95	5.65	8.15	1.9	6.25
October.....	9.0	7.05	1.95	8.1	1.5	6.60
November.....	8.15	2.5	5.65	7.50	0.7	6.80
December.....	8.80	4.3	4.50	7.4	0.9	6.60
1916.						
January.....	9.85	9.65	0.20	8.35	2.2	6.15
February.....	10.1	9.9	0.20	8.8	4.5	4.30
March.....	9.05	6.1	2.95	8.8	4.5	4.30
April.....	9.1	6.7	2.40	8.6	2.9	5.70
May.....	10.25	10.15	0.10	8.5	3.1	5.60
June.....	8.8	4.15	4.65	8.2	1.6	6.60

EXPENDITURES.

During the fiscal year there was expended \$3,970.86 for operating and care as follows:

(a) Salaries and wages for regular hired force.....	\$2, 100. 00
(b) Miscellaneous supplies and services.....	1, 518. 77
(c) Miscellaneous repairs to lock, dam, etc.....	121. 97
(d) Contingencies.....	229. 62

Total 3, 970. 86

Amounts expended under allotments, act March 3, 1909:

Fiscal year—	
1914.....	3, 165. 55
1915.....	3, 520. 13
1916.....	3, 970. 86
Total	10, 656. 04

COMMERCIAL STATISTICS.

Lockages made and traffic passed at Keystone Lock during the calendar year ended Dec. 31, 1915.

Lockages.....	459	Barges.....	182
Steamboats.....	21	Other craft.....	92
Motor boats.....	321	Passengers.....	800

Freight traffic.

Article.	Tons.	Value.	Article.	Tons.	Value.
Brick.....	55	\$165	Miscellaneous merchandise.....	103	\$10, 310
Cane, sugar.....	2, 602	10, 408	Molasses.....	3	150
Cable.....	233	14, 120	Oysters.....	100	2, 500
Coal.....	85	340	Shingles.....	20	500
Farm and dairy products.....	3	900	Wood, cord.....	524	2, 098
Lumber.....	1, 373	17, 162	Total.....	5, 106	59, 401
Miscellaneous.....	5	750			

14. INTRACOASTAL WATERWAY, FRANKLIN TO MERMENTAU, LA.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer.

Teche-Vermilion section.—This section is about 48 miles long. Papers for the purchase of the Hanson Canal have been in the hands of the Department of Justice, and some work on correcting the titles was done. The ruling depth mean low Gulf on June 30, 1916, was 5 feet through Vermilion and Cote Blanche Bays, the existing route to Morgan City.

Vermilion-Mermentau section.—This section is about 45 miles long. The U. S. steamer *Hyacinth* with U. S. derrick barge *No. 2*, worked on shoal in Schooner Bayou, near the lock, from January 25, 1916, to February 2, 1916, and removed 580 cubic yards of material at a total cost of \$212.39, or 37 cents per cubic yard. This price includes transportation of dredging outfit from Bayou Des Cannes to site of work, a distance of 119 miles. The ruling depth mean low Gulf on June 30, 1916, was 5 feet over the completed portion from western end of Vermilion Bay to the eastern end of Grand Lake. A set of regulations governing navigation over the entire completed portion of waterway was approved and published. The sum of \$2,708.90 was expended during the year which was for maintenance and supervision, and included an estimated pro rata share of repairs to U. S. dredge *Grossetete*, \$1,000.

APPROPRIATIONS.

Mar. 2, 1907.....	\$89,292.00
May 27, 1908.....	100,000.00
Mar. 4, 1909.....	100,000.00
June 25, 1910.....	12,500.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	5,000.00
July 27, 1916.....	10,000.00

Total of appropriations.....	316,792.00
Receipts from miscellaneous sources credited to appropriation.....	612.04
Grand total of receipts from all sources.....	317,404.04

COMMERCIAL STATISTICS.

Season of navigation year 1915: Opened January 1, 1915; closed December 31, 1915.

Vessel classification.

The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	5	3,500	6,000
Gas boats.....	4	3,000	.....
Sailing.....	3	3,000	.....
Unregistered:			
Gas boats.....	35	.....	.....
Unrigged barges.....	10	.....	.....
Total.....	57	9,500	6,000

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Brick.....	40,000.....	100	\$800	10	1,000
Coal.....	2,000 tons.....	2,000	8,000	10	20,000
Corn.....	3,000 bushels.....	84	2,940	35	2,940
Cotton.....	500 bales.....	125	26,000	35	4,375
Cotton seed.....	5,000 sacks.....	150	4,500	35	5,250
Farm and dairy products.....	200 tons.....	200	60,000	35	7,000
Furs.....	200,000.....	50	26,500	40	2,000
Hides.....	250.....	6	624	35	210
Live stock.....	1,000 head.....	250	50,000	35	8,750
Lumber.....	100,000 feet.....	200	2,500	35	7,000
Miscellaneous merchandise.....	600 tons.....	600	60,000	35	21,000
Oil, refined.....	50 barrels.....	10	330	35	350
Oysters.....	200 tons.....	200	5,000	35	7,000
Rice.....	4,000 sacks.....	360	28,800	10	3,600
Wood, cord.....	150 cords.....	150	600	35	5,250
Total.....		4,485	275,094	.....	95,725

It was impracticable to procure rate per ton-mile.

15. OPERATING AND CARE OF SCHOONER BAYOU LOCK, LA.

This work, which is a part of the intracoastal waterway from Franklin to Mermentau, La., is under the charge of Mr. T. E. L. Lipsey, assistant engineer. The operation of the lock throughout the year has been satisfactory. Purchased and installed eight new gate-operating winches at a total cost of \$2,273.56; constructed small operating platforms around said winches; screened lock houses; repaired and painted fences around reservation; planted trees on lock area; repaired and raised both lock houses, fences, walks, etc., which were damaged during the storm of August 16 and 17, 1915; drilled artesian well and put piping system from well to lock and houses, at a cost of \$538.46. During the extreme low-water period the gates were operated 81 times to prevent salt water from passing into White Lake. The gates were operated for test purposes once every 10 days throughout the year. The movable dam in old bend of original bayou, which was damaged during the storm of August 16 and 17, 1915, was repaired. Printed and published a set of rules and regulations governing the operation of lock.

Gauge records.—The maximum and minimum differences of level between the Vermilion Bay (east end) and White Lake (west end) at the lock for each month of the fiscal year are shown in the table following.

Date.	Maximum.			Minimum.		
	White Lake (west end).	Ver-millon Bay (east end).	Difference.	White Lake (west end).	Ver-millon Bay (east end).	Difference.
1915.						
July.....	2.2	2.1	0.1	0.5	0.5	0.0
August.....	5.9	5.8	.1	.1	.0	.1
September.....	2.5	2.4	.1	-1.8	-1.9	.1
October.....	2.1	2.1	.0	- .1	- .2	.1
November.....	1.8	1.8	.0	-1.2	-1.4	.2
December.....	1.3	1.2	.1	-1.3	-1.4	.1
1916.						
January.....	1.8	1.8	.0	-1.1	-1.2	.1
February.....	1.8	1.7	.1	-1.1	-1.3	.2
March.....	2.6	2.5	.1	-1.8	-2.0	.2
April.....	2.3	2.4	- .1	-1.9	-2.0	.1
May.....	2.3	3.0	- .7	.5	.4	.1
June.....	1.7	2.0	- .3	.5	.6	-.1

EXPENDITURES.

During the fiscal year there was expended \$5,715.40 for operating and care, as follows:

(a) Salaries and wages for regular hired force.....	\$2, 157. 58
(b) Miscellaneous supplies and services.....	419. 27
(c) Miscellaneous repairs to lock, buildings, etc.....	195. 84
(d) Contingencies.....	130. 09
(e) Special repairs (new winches).....	2, 273. 56
(f) Drilling artesian well.....	538. 46
Total.....	5, 715. 40

Amount expended under allotments, act of March 3, 1909:

Fiscal year—	
1913.....	\$774. 42
1914.....	2, 836. 54
1915.....	2, 628. 19
1916.....	5, 715. 40
Total.....	11, 952. 55

COMMERCIAL STATISTICS.

Lockages made and traffic passed at Schooner Bayou Lock during the calendar year ended Dec. 31, 1915.

Lockages.....	1, 854	Barges.....	44
Tugs and scows.....	11	Other crafts.....	181
Steamboats.....	10	Passengers.....	5, 136
Motor boats.....	1, 139		

Freight traffic.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Brick.....	3	\$9	Oil, fuel.....	9	\$72
Coal.....	71	284	Miscellaneous.....	281	24, 650
Cotton.....	57	11, 400	Miscellaneous merchandise.....	265	26, 500
Farm and dairy products.....	145	43, 500	Molasses.....	3	130
Furs.....	3	1, 580	Oysters.....	100	2, 500
Gasoline.....	5	205	Rice.....	4	320
Ice.....	8	80	Sugar.....	1	80
Iron and steel products.....	5	300			
Live stock.....	126	25, 000	Total.....	1, 145	148, 015
Lumber.....	110	1, 976			

16. INTRACOASTAL WATERWAY, MERMENTAU RIVER TO SABINE RIVER, LA. AND TEX.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer.

Mermentau-Calcasieu section.—This section is about 37.5 miles long. Work on securing rights of way over this section was carried on by the Interstate Waterway League of Louisiana and Texas, in conjunction with this office. As it was proven impossible to secure rights of way along the approved route, a request was made to change the western portion of the route via Watkins Canal and Bayou Black under date May 6, 1916, which was approved by the Secretary of War on May 19, 1916. All of the deeds have been secured and abstracts are under way.

Calcasieu-Sabine section.—This section is 22½ miles long. The work of maintenance was carried on. The ruling depth, mean low Gulf, on June 30, 1916, was 5 feet.

A set of regulations governing navigation over the entire completed portion of waterway was approved and published.

The sum of \$12,620.18 (Government funds) and \$5,229.31 (contributed funds): a total of \$17,849.49, was expended during the year for improvement.

APPROPRIATIONS.

June 25, 1910.....	\$100,000.00
July 25, 1912.....	100,000.00
Mar. 4, 1913.....	190,000.00
Mar. 4, 1915 (allotted April 2, 1915).....	5,000.00
July 27, 1916.....	10,000.00
Total.....	405,000.00
Amount received from contributed funds during fiscal year 1915..	15,000.00
Grand total of receipts from all sources.....	420,000.00
Amount returned to contributing interests.....	1,733.03
	418,266.97
Miscellaneous receipts deposited to the credit of the appropriation..	38.25
Total.....	418,305.22

COMMERCIAL STATISTICS.

SABINE RIVER TO CALCASIEU RIVER SECTION.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

Class.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Gas boats.....	5	1,000	500
Sailing.....	2	200	.....
Unregistered:			
Gas boats.....	5	.....	.....
Unrigged barges.....	10	.....	.....
Total.....	22	1,300	500

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Cement.....	105 tons.....	105	\$1,260	12	1,260
Coal.....	3 tons.....	3	12	20	60
Corn.....	304 bushels.....	9	315	20	180
Feed, ground.....	1,350 sacks.....	68	2,040	20	1,360
Fertilizer.....	6 tons.....	6	204	20	120
Gravel.....	460 tons.....	460	480	12	5,520
Hay.....	14 tons.....	14	168	20	280
Iron and steel.....	50 tons.....	50	3,000	5	250
Live stock.....	8,260 head.....	2,065	413,000	12	24,780
Lumber.....	688,000 feet.....	1,376	17,200	20	27,520
Machinery.....	3 tons.....	3	300	20	60
Miscellaneous merchandise.....	4,100 tons.....	4,100	41,000	20	82,000
Oats.....	2,031 bushels.....	30	990	20	600
Oil, refined.....	1,650 barrels.....	239	9,537	20	5,780
Potatoes.....	260 barrels.....	22	1,110	20	440
Rice.....	20,340 barrels.....	814	65,120	20	16,280
Sand.....	190 tons.....	190	190	12	2,280
Shells.....	4,000 yards.....	4,000	3,200	20	80,000
Steel.....	700 tons.....	700	42,000	20	14,000
Wood, cord.....	4 cords.....	4	18	20	80
Total.....		14,308	601,122	.....	262,850

New boats and 18 barges, 3,950 tons, included in item "Miscellaneous merchandise."
It was impracticable to procure rate per ton-mile.

17. BAYOU VERMILION, MERMENTAU RIVER, AND BAYOU PLAQUE-MINE BRULÉ, LA.

(A) CHANNEL, BAY, AND PASSES OF BAYOU VERMILION, LA.

These works are under the charge of Mr. T. E. L. Lipsey, assistant engineer.

The U. S. S. *Hyacinth*, with U. S. derrick barge *No. 2*, worked on stream from February 3 to 6, 1916, and from March 15 to 23, 1916, and removed from mouth to mile 40.9 (Broussards Bridge) the following obstructions: Fifteen trees, 2 snags, and 1 old barge, at a total cost of \$350.57. This price includes cost of moving plant from Schooner Bayou to site of work.

The U. S. derrick barge *No. 2* worked on the stream from March 23, 1916, to end of fiscal year and removed from mile 40.9 to mile 43.3, 16,583 cubic yards of material and the following obstructions: Four hundred and fifty-five trees, 2,952 snags, and 15 stumps, at a total field cost of \$1,559.37, or 9.4 cents per cubic yard, including obstructions.

The ruling depths, mean low Gulf, over stream on June 30, 1916, were as follows: Over bar, 3 to 4 feet; mile 0 to mile 31, 7.9 to 26 feet; mile 31 to mile 42, 5 to 14 feet; and mile 42 to mile 51, 1.4 to 14 feet, mile 0 being at mouth of stream.

The sum of \$2,752.56 was expended during the year, which was for maintenance, and included a pro rata share of construction of U. S. quarter boat *Choupique*, \$500.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 570)--- \$9,900.00

Present project:

July 13, 1892.....	\$7,500.00
Aug. 18, 1894.....	5,000.00
June 3, 1896.....	1,000.00
Mar. 3, 1899.....	2,500.00
June 13, 1902 (allotted July 16, 1902).....	9,000.00
June 13, 1902 (allotted Dec. 31, 1903).....	200.00
Mar. 3, 1905 (allotted May 23, 1905).....	1,000.00
Mar. 3, 1905 (allotted Apr. 23, 1912).....	3,000.00
Mar. 2, 1907 (allotted Apr. 3, 1907).....	7,000.00
Mar. 2, 1907 (allotted Jan. 8, 1910).....	5,000.00
Mar. 2, 1907 (allotted May 7, 1910).....	4,970.59
Mar. 3, 1909 (allotted Mar. 27, 1909).....	2,500.00
Mar. 3, 1909 (allotted May 7, 1910).....	29.41
June 25, 1910 (allotted July 23, 1910).....	3,000.00
July 25, 1912 (allotted Sept. 26, 1912).....	500.00
Mar. 4, 1913 (allotted May 7, 1913).....	3,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	2,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	2,000.00
July 27, 1916 (allotted Aug. 16, 1916).....	5,000.00
	<hr/> 64,200.00

Total of appropriations..... 74,100.00
 Apr. 3 and Nov. 11, 1911, amount transferred to allotment for "Im-
 proving Bayou Plaquemine Brulé, La."..... 1,800.00

Net total of appropriations..... 72,300.00

LEASE IN FORCE.

Name and address of lessor: S. R. Rice, Esther, La.

Nature of lease: Hire of launch *Reindeer*, used as a tender for derrick barge No. 2.

Date: June 10, 1916.

Cost: \$50 per month; payment is to be made only for the days on which launch is used.

Date of commencement: June 1, 1916.

Percentage of completion at end of fiscal year: 98.

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passen- gers.
AMERICAN.			
Registered:			
Steamers.....	6	5,500	5,000
Gas boats.....	3	5,600	
Sailing.....	2	1,000	
Unregistered:			
Gas boats.....	35		
Unrigged barges.....	25		
Total.....	71	12,100	5,000

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Brick.....	10,000.....	25	\$75	18	450
Cane sugar.....	15,000 tons.....	15,000	60,000	18	240,000
Coal.....	300 tons.....	300	1,200	40	12,000
Corn.....	250 bushels.....	7	245	40	280
Cotton.....	500 bales.....	125	25,000	25	3,125
Cotton seed.....	2,000 sacks.....	100	3,000	25	2,500
Farm and dairy products.....	145 tons.....	145	43,500	40	5,800
Furs.....	100 000.....	25	13,250	40	1,000
Feed, ground.....	750 sacks.....	37	1,110	18	666
Fertilizer.....	200 tons.....	200	6,800	12	2,400
Hides.....	250.....	6	624	40	240
Livestock.....	800 head.....	150	30,000	40	6,000
Lumber.....	50,000 feet.....	100	1,250	30	3,000
Machinery.....	16 tons.....	16	1,600	14	224
Miscellaneous merchandise.....	500 tons.....	500	5,000	20	10,000
Oil:					
Fuel.....	20,000 barrels.....	3,100	24,800	20	62,000
Refined.....	1,500 barrels.....	300	9,900	20	6,000
Oysters.....	100 tons.....	100	2,500	60	6,000
Potatoes.....	260 barrels.....	22	1,100	40	880
Rice.....	5,000 sacks.....	450	36,000	18	8,100
Wood, cord.....	500 cords.....	500	2,000	20	10,000
Total.....		21,208	268,964	.....	380,665

It was impracticable to procure rate per ton-mile.

(B) MERMENTAU RIVER AND TRIBUTARIES, LA.

The U. S. steamer *Hyacinth*, with U. S. derrick barge *No. 2*, worked on Bayou Nezpieque from December 3, 1915, to January 7, 1916, and removed obstructions from mile 0 at mouth to mile 21½, and removed the following obstructions: 84 snags, 106 overhanging trees, and 2 stumps, at a total cost of \$1,039.51, or \$5.41 per obstruction. This price includes transportation of snagging equipment from Bayou Plaquemine Brule to the site of the work.

Preliminary examination of Mermentau River was made on July 5 to 8, 1915, and report submitted to the department on September 20, 1915.

Survey of Mermentau River was made on February 29 to March 6, 1916, and report and estimate submitted to the department on June 30, 1916. Preliminary examination report of Mermentau Dam was made on July 5, 1915, and preliminary report was submitted on September 20, 1915. Supplemental report was submitted on April 27, 1916. Survey report and estimate on Mermentau Dam was submitted to the department on March 25, 1916, and supplemental report on April 27, 1916.

The ruling depths (mean low Gulf) on June 30, 1916, were as follows: Main stream, 6 feet; Pass (bar), 3 feet; Lower Mud Lake, 4 feet; Grand Lake, lower end, 3 feet; upper end, 3.8 feet. Depth in Bayou Nezpieque is 7 feet. The sum of \$822.15 was expended during the year, which was for maintenance.

APPROPRIATIONS.

July 13, 1892-----	\$7,500.00
Aug. 18, 1894-----	5,000.00
June 3, 1896-----	5,000.00
Mar. 3, 1899-----	6,115.25
June 13, 1902-----	2,500.00
Mar. 3, 1905 (allotted May 23, 1905)-----	2,000.00
Mar. 2, 1907 (allotted Apr. 5, 1907)-----	18,000.00
Mar. 3, 1909 (allotted Mar. 27, 1909)-----	227.05
June 25, 1910 (allotted July 23, 1910)-----	2,000.00
July 25, 1912 (allotted Sept. 26, 1912)-----	500.00
Mar. 4, 1913 (allotted May 7, 1913)-----	2,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	1,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	3,000.00
July 27, 1916 (allotted Aug. 16, 1916)-----	6,000.00
Total of appropriations-----	60,842.30
Dec. 31, 1903, amount transferred to allotment for "Im- proving channel, bay, and passes of Bayou Vermillion, La."-----	\$200.00
Jan. 8 and May 7, 1910, amount transferred to allotment for "Improving channel, bay, and passes of Bayou Ver- million, La."-----	10,000.00
Aug. 3, 1911, amount transferred to allotment for "Im- proving Bayou Plaquemine Brule, La."-----	2,000.00
Jan. 7, 1916, amount transferred to tributary, Bayou Des Cannes, La. (act of July 25, 1912)-----	500.00
	12,700.00
Net total-----	48,142.30
Miscellaneous receipts deposited to credit of appropriation-----	.75
Grand total-----	48,143.05

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.	Passen- gers.
AMERICAN.			
Registered:			
Steamers-----	5	3,000	9,000
Sailing-----	4	2,000	.....
Gas boats-----	5	4,500	.....
Unregistered:			
Gas boats-----	30	.....	.....
Unrigged barges-----	25	.....	.....
Total-----	69	9,500	9,000

1 Allotment of \$1,500 of which \$1,272.95 was returned to Treasury to credit of appropriation.

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Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Brick.....	40,000.....	100	\$300	10	1,000
Coal.....	2,260 tons.....	2,260	9,040	10	22,600
Corn.....	5,000 bushels.....	140	4,900	40	5,600
Cotton.....	1,350 bales.....	337	67,400	20	6,740
Cotton seed.....	5,000 sacks.....	150	4,500	20	3,000
Eggs.....	200 cases.....	6	1,500	60	360
Fish.....	10 tons.....	10	2,000	20	200
Feed, ground and grain.....	315 tons.....	315	9,450	10	3,150
Fertilizer.....	25 tons.....	25	850	40	1,000
Furs.....	150,000.....	37	19,610	50	1,850
Hides.....	50 tons.....	50	5,000	60	3,000
Lime.....	100 barrels.....	10	100	50	500
Logs.....	600,000 feet.....	2,400	7,500	30	72,000
Lumber.....	1,472,000 feet.....	2,944	26,800	50	147,200
Live stock.....	3,500 head.....	875	175,000	50	43,750
Machinery.....	270 tons.....	270	27,000	50	13,500
Miscellaneous merchandise.....	2,000 tons.....	2,000	200,000	30	60,000
Oats.....	500 bushels.....	7	231	10	70
Oil:					
Fuel.....	52,140 barrels.....	8,082	64,656	80	484,920
Refined.....	300 barrels.....	46	1,518	60	2,760
Oysters.....	100 tons.....	100	2,500	40	4,000
Potatoes.....	660 barrels.....	58	2,900	40	2,320
Oranges.....	5,000 boxes.....	250	15,000	40	10,000
Rice.....	35,700 sacks.....	3,213	257,040	40	128,520
Salt.....	50 tons.....	50	150	40	2,000
Shingles.....	200,000.....	40	1,000	50	2,000
Wood, cord.....	160 cords.....	160	640	30	4,800
Total.....		28,935	961,645		1,026,840

It was impracticable to procure rate per ton-mile.

(C) BAYOU DES CANNES.

An allotment of \$500 for the improvement of this stream was made from appropriation for "Mermentau River and tributaries, La.," on January 7, 1916, under the provisions of section 1, river and harbor act approved July 25, 1912.

The U. S. S. *Hyacinth*, with U. S. derrick barge *No. 2*, worked on this stream from January 8 to 24, 1916, and removed from mile $1\frac{1}{2}$ above mouth to mile $8\frac{1}{2}$ the following obstructions: 127 trees, 159 snags, and one wreck of old boat, at a total cost of \$500, or \$1.74 per obstruction. Ruling depth, 5 feet mean low Gulf. The sum of \$500 was expended during the year, which was for improvement.

APPROPRIATIONS.

Jan. 7, 1916, amount allotted from appropriation "Maintenance and improvement of existing river and harbor works," from allotment for Mermentau River and tributaries..... \$500

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.
AMERICAN.		
Unregistered:		
Steamers.....	4	.....
Gas boats.....	4	.....
Unrigged barges.....	35	1,400
Total.....	43	1,400

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
Logs.....	200,000 feet.....	800	\$2,500	10	8,000
Lumber.....	194,000 feet.....	388	4,850	10	3,880
Machinery.....	50 tons.....	50	5,000	12	600
Miscellaneous merchandise.....	50 tons.....	50	5,000	12	600
Oil, fuel.....	38,251 barrels.....	5,928	47,814	12	71,136
Total.....		7,216	65,164	.....	84,216

It was impracticable to procure rate per ton-mile.

(D) BAYOU PLAQUEMINE BRULÉ, LA.

The U. S. steamer *Hyacinth*, with U. S. derrick barge *No. 2*, worked on this stream from November 1, 1915, to November 30, 1915, and removed obstructions from mile 0, at mouth, to mile 19, the head of improvement, and removed the following obstructions: Thirty-three trees and 156 snags, at a total cost of \$841.53, or \$4.45 per obstruction. This price includes moving plant from Keystone Lock, Bayou Teche, La., to the site of work, a distance of 240 miles.

The ruling depth, mean low Gulf, over this stream on June 30, 1916, was 6 feet. The sum of \$1,572.55 was expended during the year, which was for maintenance, and included a pro rata share of construction of the U. S. quarter boat *Choupique*, \$500.

APPROPRIATIONS.

June 25, 1910 (allotted July 23, 1910).....	\$5,000.00
June 25, 1910 (allotted Aug. 3, 1911).....	2,000.00
June 25, 1910 (allotted Aug. 3, 1911).....	1,000.00

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June 25, 1910 (allotted Nov. 11, 1911).....	\$800.00
July 25, 1912 (allotted Sept. 28, 1912).....	4,000.00
Mar. 4, 1913 (allotted May 7, 1913).....	11,200.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	8,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	3,000.00
July 27, 1916 (allotted).....	2,000.00
Total of appropriations.....	38,000.00
Miscellaneous receipts deposited to credit of appropriation.....	47.20
Grand total of receipts from all sources.....	38,047.20

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.
AMERICAN.		
Registered:		
Steamers.....	8	200
Gas boats.....	2	300
Unregistered:		
Gas boats.....	5	
Unrigged barges.....	6	
Total.....	16	500

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Brick.....	30,000.....	75	\$225	20	1,500
Logs.....	1,000,000 feet.....	4,000	12,500	20	80,000
Lumber.....	500,000 feet.....	1,000	12,500	20	20,000
Miscellaneous merchandise.....	150 tons.....	150	15,000	15	2,250
Oil, fuel.....	7,690 barrels.....	1,191	9,528	15	17,865
Wood, cord.....	500 cords.....	500	20,000	15	7,500
Total.....		6,916	69,753		129,115

It was impracticable to obtain rate per ton-mile.

18. BAYOU QUEUE DE TORTUE, LA.

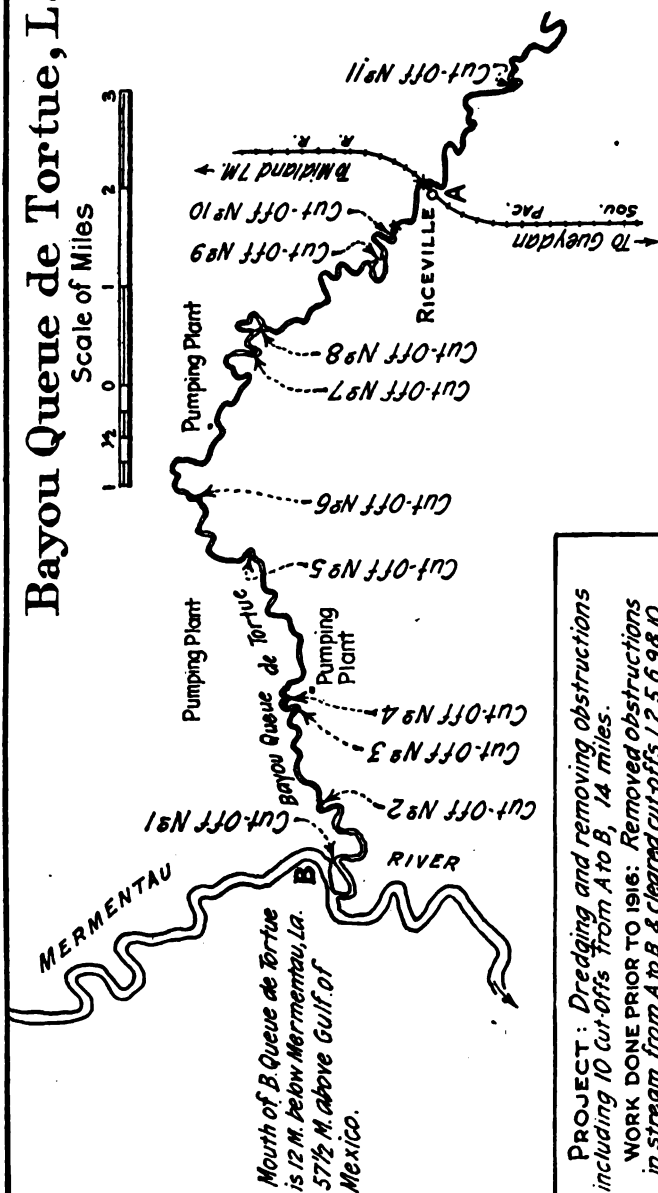
This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer. Work on securing rights of way for the 10 cut-offs on this stream was carried on by interested parties in conjunction with this office. All papers in case were forwarded to the Chief of Engineers for action of the Department of Justice on May 20, 1916, for approval. The ruling depth, mean low Gulf, over stream on June 30, 1916, was

Bayou Queue de Tortue, La.

Scale of Miles



N.



PROJECT: Dredging and removing obstructions including 10 Cut-Offs from A to B, 14 miles.

WORK DONE PRIOR TO 1916: Removed obstructions in stream from A to B & cleared cut-offs 1, 2, 5, 6, 9 & 10.

WORK DONE DURING 1916: Secured RofW. for cut-offs.

WORK STILL REQUIRED: Right of Way. Dredging of stream and cut-offs.

RULING DEPTH: M. L. G. Mile 0 to 11, 6 ft.; Mile 11 to 14 3.8 ft.

U.S. Eng'r. Office, New Orleans, La.
To accompany annual report for the
Fiscal Year ending June 30, 1916.

Edward L. Searcy
Major, Corps of Engineers, U.S.A.

6 feet from mile 0 to mile 11, and 3.8 feet from mile 11 to mile 14, mile zero being at mouth of stream. The sum of \$1,189.58 was expended during the year, which was for improvement, supervision, and office expenses, and included an estimated pro rata share of repairs to U. S. dredge *Grossetete*, \$500.

APPROPRIATIONS.

July 25, 1912.....	\$25,000.00
Mar. 4, 1913.....	1,000.00
July 27, 1916.....	3,000.00
Total of appropriations.....	29,000.00

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Class.	Number.	Net registered tonnage.
AMERICAN.		
Registered:		
Steamers.....	2	200
Gas boats.....	2	250
Unregistered:		
Gas boats.....	5	
Unrigged barges.....	15	
Total.....	24	450

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Brick.....	30,000.....	75	\$225	15	1,125
Logs.....	500,000 feet.....	2,000	5,250	20	40,000
Lumber.....	75,000 feet.....	150	1,875	13	2,700
Machinery.....	20 tons.....	20	2,000	20	400
Miscellaneous merchandise.....	100 tons.....	100	10,000	13	1,300
Oil, fuel.....	14,216 barrels.....	2,303	17,624	20	44,060
Rice.....	5,125 sacks.....	461	36,580	13	5,298
Wood, cord.....	250 cords.....	250	1,000	20	5,000
Total.....		5,259	75,854		103,383

It was impracticable to obtain rate per ton-mile.

19. CALOASIEU RIVER AND PASS, LA.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer. Work on securing deeds for cut-off in river below Lake Charles, La., was carried on by interested parties. All papers in case

were forwarded to the Chief of Engineers for action by the Department of Justice on May 29, 1916, for approval. The ruling depths, mean low Gulf, of stream on June 30, 1916, are as follows: Pass (bar), 8 feet; Pass, 12 feet; Calcasieu Lake, 3.3 feet at lower end and 5 feet at upper end; Prien Lake, 6 feet; river, 7 feet to Jones Bluff and 3 feet Jones Bluff to Philips Bluff. The sum of \$260.33 was expended during the year which was for maintenance, supervision, and office expenses.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 417) -- \$58,500.00
Present project:

Sept. 19, 1890	\$75,000.00	
July 18, 1892	100,000.00	
Aug. 18, 1894	90,000.00	
June 3, 1896	80,000.00	
Mar. 3, 1899	35,000.00	
June 13, 1902	75,000.00	
Mar. 3, 1905	100,000.00	
Mar. 2, 1907 (allotted Apr. 2, 1907)	25,000.00	
Mar. 3, 1909 (allotted from appropriation "Preservation and maintenance of river and harbor works")	8,000.00	
June 25, 1910	5,000.00	
Mar. 4, 1915 (allotted from appropriation for "Maintenance and improvement of existing river and harbor works")	3,000.00	
July 27, 1916	2,500.00	
		598,500.00
Total of appropriations		655,000.00
Total amount reverted to surplus fund of Treasury		8,076.55
Net total of appropriations		646,923.45
Miscellaneous receipts deposited to credit of appropriation		3.25
Total		646,926.70

COMMERCIAL STATISTICS.

Season of navigation, year 1915: Opened January 1; closed December 31, 1915.

Vessel classification.

[The number of vessels is the number of different vessels operating on the stream. The net registered tonnage is the net tonnage of each vessel multiplied by the number of trips made by each vessel and added together.]

Classes.	Number.	Net registered tonnage.	Passengers.
AMERICAN.			
Registered:			
Steamers	10	\$1,500	6,000
Sailing	4	600	
Gas boats	12	8,000	
Unregistered:			
Gas boats	10		
Unrigged barges	35		
Total	71	60,180	6,000

Calcasieu River, La.

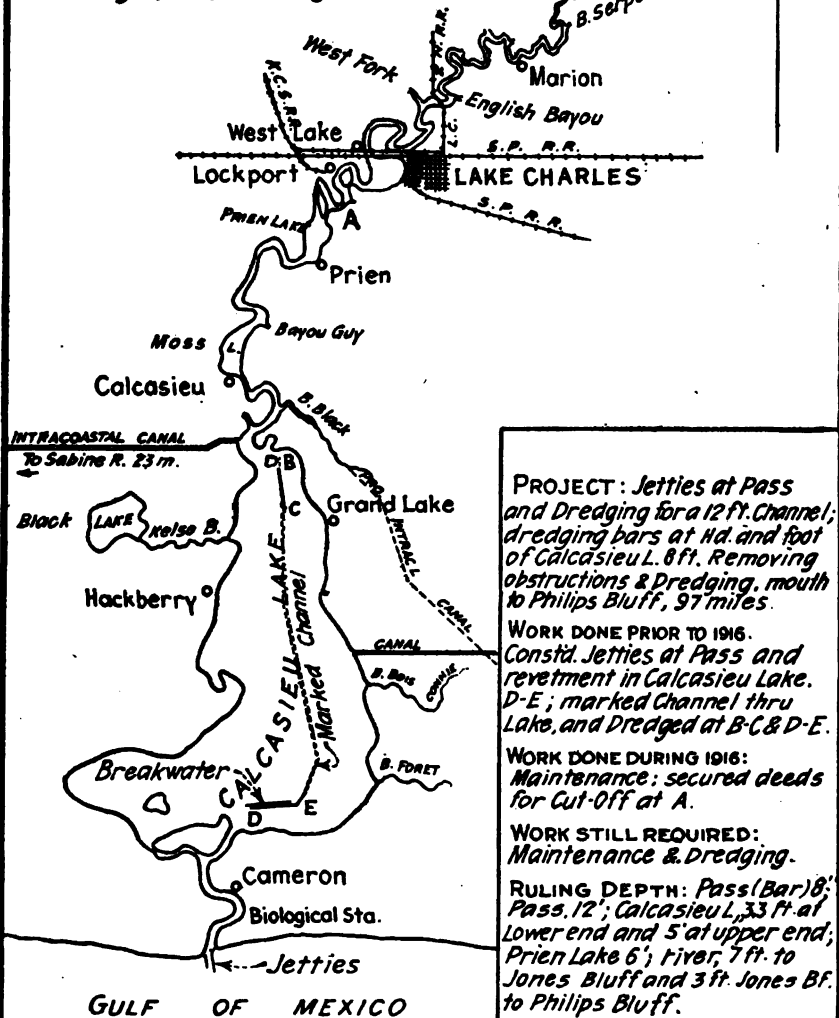
Scale of Miles



U.S. Engineer Office, N.O., La.
To accompany annual report for the
Fiscal Year ending June 30, 1916.

Edward H. Schling
Major, Corps of Engrs., U.S.A.

N.



A. N. C.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Ton-mile statistics.
				<i>Miles.</i>	
Brick.....	20,000.....	50	\$150	45	2,250
Cement.....	100 tons.....	100	1,200	45	4,500
Coal.....	655 tons.....	655	2,520	40	26,200
Corn.....	1,000 bushels.....	25	950	35	880
Cotton.....	100 bales.....	25	5,000	5	125
Cotton seed.....	600 sacks.....	15	540	5	90
Feed, ground.....	225 tons.....	225	6,750	35	7,875
Fish.....	30 tons.....	30	6,000	50	1,500
Fertilizer.....	50 tons.....	50	1,530	45	2,250
Furs.....	1 ton.....	1	530	40	40
Gravel.....	270 tons.....	270	270	45	12,150
Hides.....	10 tons.....	10	1,000	40	400
Iron and steel.....	750 tons.....	750	45,000	35	26,250
Live stock.....	13,650 head.....	3,412	682,400	50	170,600
Lime.....	100 barrels.....	10	100	45	450
Lumber.....	1,273,000 feet, l. m.....	2,546	31,825	30	76,380
Logs.....	157,280,208 feet.....	628,921	1,965,378	15	9,433,815
Miscellaneous merchandise.....	3,950 tons.....	3,950	395,000	35	138,250
Molasses.....	3 tons.....	3	150	25	75
Oysters.....	28 tons.....	28	700	50	1,400
Potatoes.....	150 sacks.....	6	300	20	120
Rice.....	56,537 sacks.....	5,058	407,040	40	203,520
Rosin.....	162 barrels.....	40	1,280	40	1,600
Sand.....	20,000 tons.....	20,000	20,000	25	500,000
Salt.....	25 tons.....	25	75	25	625
Shells.....	8,850 tons.....	8,850	7,080	25	221,250
Shingles.....	75,000.....	15	475	40	600
Sugar.....	1,400 barrels.....	300	24,000	50	15,000
Wood, cord.....	20,025 cords.....	20,025	80,100	40	801,000
Total.....		665,431	3,687,473		13,649,295

It was impracticable to obtain rate per ton-mile.

20. REMOVING THE WATER HYACINTH, MISSISSIPPI, LOUISIANA, AND TEXAS.

This work is under the charge of Mr. T. E. L. Lipsey, assistant engineer.

The U. S. steamer *Hyacinth* operated on various streams in southern Louisiana where the growth of the water hyacinth threatened to obstruct navigation. The principal streams where work was done are as follows: Bayous Black (near Gibson), Des Allemands, Barataria, Chevreuil, Teche, Des Cannes, Plaquemine Brule, Queue de Tortue, and Lacassine; also Belle (Flat Lake), Ponchatoula, Tick-faw, Blood, and Vermilion Rivers.

During the winter months when no spraying operations were necessary this boat, in connection with U. S. derrick barge *No. 2*, did some snagging and dredging on the following streams: Bayou Plaquemine Brule, Bayou Nezpieque, Bayou Des Cannes, Schooner Bayou, and Vermilion River. It was used on numerous inspection trips. The steamer was taken out on ways and thoroughly overhauled, at a total cost of \$798.73. An order for new boiler was placed, at a cost of approximately \$2,500.

United States booms were maintained and operated in conjunction with parish authorities and local interests in upper Vermilion River,

Lake Palourde, Bayou Des Allemands, Bayou Long (Flat Lake), Bayou Black to Gibson, Bayou Chene, Bayou Cocodrie (Des Allemands), Bayou Leau Bleu, and other small streams, thereby keeping the hyacinth from spreading into the navigable waterways.

In spraying operations, 494,000 gallons of spraying solution was used, consisting of 28,292 pounds of arsenic and 26,550 pounds of soda, destroying approximately 4,940,000 square yards of hyacinths. The solution cost \$1,706.58.

The U. S. spraying barge *No. 1* operated during spraying season on Bayou Teche above Keystone Lock as far upstream as Breaux Bridge, La. This plant used 190,000 gallons of solution, consisting of 9,584 pounds of arsenic and 11,525 pounds of soda, destroying approximately 1,900,000 square yards of hyacinths. The solution cost \$600.31.

The sum of \$15,578.02 was expended during the year, which was for improvement, supervision, and office expenses.

APPROPRIATIONS.

Mar. 3, 1899	\$38,000.00
June 13, 1902 (allotted Aug. 9, 1902)	18,000.00
June 13, 1902 (allotted Sept. 26, 1902)	1,480.00
June 13, 1902 (allotted Dec. 4, 1903)	500.00
Apr. 28, 1904 (allotted June 4, 1904)	15,000.00
Mar. 3, 1905	40,000.00
Mar. 2, 1907 (allotted Apr. 6, 1907)	10,000.00
Mar. 2, 1907 (allotted Feb. 24, 1909)	5,000.00
Mar. 3, 1909 (allotted Mar. 26, 1909)	20,000.00
June 25, 1910	20,000.00
Feb. 27, 1911	20,000.00
Mar. 4, 1913	15,000.00
Oct. 2, 1914 (allotted Oct. 21, 1914)	12,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)	20,000.00
July 27, 1916	20,000.00
Total of appropriations	252,980.00
Amount withdrawn and allotted to Buffalo Bayou, Tex.	\$500.00
Amount withdrawn and allotted to Mobile (Ala.) district	850.00
	850.00
Net total of appropriations	252,130.00
Miscellaneous receipts deposited to credit of appropriation	1,143.74
Total	253,273.74

LEASE IN FORCE.

Name and address of lessor: J. F. Franz, St. Martinville, La.

Nature of lease: Hire of launch, with gasoline engineer to run same, used in connection with spraying barge *No. 1*.

Date: May 1, 1916.

Cost: \$3.50 per day, payment being made only for the days on which launch is used.

Date of commencement: May 3, 1916.

Date of completion: May 3, 1916.

IMPROVEMENT OF RIVERS AND HARBORS IN THE GALVESTON, TEX., DISTRICT.

REPORT OF LIEUT. COL. C. S. RICHE, CORPS OF ENGINEERS.

IMPROVEMENTS.

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1. Galveston Harbor, Tex.....	2471	8. Maintenance and care of booms and bridges, Inland Waterway on coast of Texas	2498
2. Galveston Channel, Tex.....	2472	9. Mouth of Brazos River, Tex..	2499
3. Channel from Galveston Harbor to Texas City, Tex	2478	10. Brazos River, Tex., from Velasco to Old Washington....	2500
4. Channel to Port Bolivar, Tex..	2480	11. Brazos River, Tex., from old Washington to Waco.....	2501
5. Houston Ship Channel, Tex....	2482	12. Operating and care of Lock and Dam No. 1, Brazos River...	2502
6. West Galveston Bay Channel; Turtle Bayou; Trinity River, Anahuac Channel; Oyster Creek; Cedar, Chocolate, and Bastrop Bayous, Tex., including mouths of adjacent streams.....	2486	13. Channel from Pass Cavallo to Port Lavaca, Tex.....	2503
7. Inland Waterway, on coast of Texas, including West Galveston Bay and Brazos River Canal, channel between Brazos River and Matagorda Bay, channel from Aransas Pass to Pass Cavallo, including Guadalupe River, Turtle Cove, and channel from Aransas Pass to Corpus Christi, Tex.....	2494	14. Port Aransas, Tex.....	2503
		15. Channel from Aransas Pass to Corpus Christi, Tex.....	2506

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 922 TO 982.

1. GALVESTON HARBOR, TEX.

No work has been performed during the fiscal year and no dredging has been found necessary since June, 1914, and especial attention is called to map of latest survey of June 21, 1916, which shows a navigable channel midway between the jetties with a least depth of 32½ feet and a width of 1,450 feet between 30-foot contours at its narrowest point. The old channel around end of south jetty is gradually narrowing and filling, having a least depth of 29.6 feet on June 21, 1916. The hurricane of August 16-17, 1915, caused some damage to the jetties and an estimate has been prepared for their repairs. The sum of \$29,233.50 was expended during this year for surveys, repairs on account of storm damage to Fort Point depot, upkeep of tugs and launches, superintendence, inspection, etc.

APPROPRIATIONS.

For previous projects (acts of July 11, 1870, to June 30, 1906, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 456) ----- \$9,723,000.00
Transferred to Galveston Channel (act Mar. 3 1905)----- 50,000.00

9,678,000.00

2471

For present project:

Mar. 2, 1907-----	\$300,000.00
May 27, 1908-----	680,000.00
Mar. 3, 1909 (allotted Mar. 27, 1909)-----	200,000.00
Mar. 3, 1909 (allotted Mar. 25, 1909)-----	25,000.00
Mar. 4, 1909-----	70,000.00
June 25, 1910-----	¹ 250,000.00
Feb. 27, 1911-----	155,000.00
July 25, 1912-----	75,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	25,000.00
July 27, 1916-----	325,000.00
	<hr/> \$2,055,000.00
Total of appropriations-----	<hr/> 11,733,000.00

In addition to the above appropriations by Congress, the following additional amounts have been received:

Collected from the steamer <i>Maratine</i> -----	300.00
Collected from the Quartermaster Department, United States Army-----	719.83
Transfer of tug <i>Anna</i> -----	10,000.00
Proceeds of sales of condemned property-----	3,676.37
Proceeds of sales of charts of Galveston Bay-----	288.40
Proceeds of sales of contact prints-----	15.99
Proceeds of sales of old boilers of dredge <i>Comstock</i> -----	1,200.00
Collected from rental of dredge <i>Galveston</i> -----	17,778.39
Proceeds from mess account-----	1.75
Collected from rental of dredge <i>Comstock</i> -----	7,278.54
Proceeds of sales of wreck of dredge <i>Comstock</i> -----	750.00
	<hr/> 42,007.27
Total miscellaneous receipts-----	<hr/> 42,007.27
Grand total-----	<hr/> 11,775,007.27

2. GALVESTON CHANNEL, TEX.

Maintenance work was carried on during the year with the U. S. seagoing dredge *Galveston*, October 27, 1915, to April 7, 1916, and pipeline dredge *Colonel A. M. Miller*, March 19 to April 18, 1916, partially restoring the channel to a depth of 30 feet between Fort Point and Pier 12, a distance of about 2 miles and for a width of 200 feet, on the south side of the channel. Dredging was also done between the United States life-saving station and the United States quarantine station, opposite Fort Point, on the north side of the channel, and placing the excavated material over the pile and brush fence between those points to protect the channel from cross currents. Ruling depth on June 30, 1916, was 28.8 feet. A total of 1,007,774 cubic yards were excavated at a total cost of \$111,078.13, including superintendence, inspection, and office expenses and repairs to Fort Point depot. The hurricane of August 16-17, 1915, caused some shoaling in the channel between Fort Point and Pier 12.

APPROPRIATIONS.

For previous projects (acts of June 13, 1902, to Mar. 3, 1909, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 456)-----	\$895,000.00
Diverted from Galveston Harbor (act Mar. 3, 1905)-----	50,000.00
	<hr/> 945,000.00

¹ Appropriation of \$350,000, of which \$100,000 was diverted to Galveston Channel.

For present project:

June 25, 1910.....	\$250,000.00
June 25, 1910 (diverted from Galveston Harbor).....	100,000.00
Feb. 27, 1911.....	125,000.00
July 25, 1912.....	100,000.00
Mar. 4, 1913.....	200,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	100,000.00
July 27, 1916.....	800,000.00
	<hr/> \$1,175,000.00

Total appropriations..... 2,120,000.00

In addition to the above appropriations by Congress, the following additional amounts have been received:

Proceeds of sales of condemned property.....	1,785.08
Receipts from sales of contact prints.....	27.95
Rental of dredge <i>Miller</i>	169.97
Rental of dredge <i>Comstock</i>	1,155.08
	<hr/> 3,088.08

Grand total..... 2,123,088.08

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

	Number.	Tonnage.
American vessels entered foreign:		
Steam.....	74	171,62 ⁹
Sail.....	4	1,940
Foreign vessels entered foreign:		
Steam.....	535	1,124,257
Sail.....	4	3,532
Total.....	617	1,301,358
American vessels cleared foreign:		
Steam.....	78	181,366
Sail.....	3	1,255
Foreign vessels cleared foreign:		
Steam.....	667	1,474,370
Sail.....	6	3,318
Total.....	754	1,660,309
American vessels entered coastwise, steam ¹	401	1,035,659
Foreign vessels entered coastwise:		
Steam.....	158	395,593
Sail.....	3	1,389
Total.....	562	1,432,641
American vessels cleared coastwise, steam ¹	401	1,035,399
Foreign vessels cleared coastwise:		
Steam.....	38	70,773
Sail.....	1	388
Total.....	439	1,106,560
Grand total.....	2,372	5,500,868

¹ Accurate records of American coastwise traffic unobtainable. Duties on imports collected for port \$1,063,018.64. All moneys collected at customhouse for port, \$1,135,068.02. Passengers: Arrivals and departures, foreign ports, 1,996, coastwise, 5,691.

Foreign imports, domestic exports, and coastwise trade.

FOREIGN IMPORTS.

Articles.	Amount in customary units.	Amount in short tons.	Value.
American goods returned.....	90 tons.....	90	\$89,391
Animal hair.....	95,570 pounds.....	47	15,075
Automobiles.....	1.....	1	2,233
Bacon and hams.....	28,200 pounds.....	14	3,762
Bags of jute.....	50,090 pounds.....	25	1,000
Bagging.....	48,424 square yards.....	42	6,514
Bananas.....	1,083,775 bunches.....	38,107	311,162
Beans.....	71,979 bushels.....	2,159	200,353
Beeswax.....	719 pounds.....		148
Benzine, gasoline, and naphtha.....	1,134,000 gallons.....	3,402	34,239
Brandy.....	119 gallons.....		215
Brass, old.....	19,510 pounds.....	10	1,873
Carpet wool.....	815,300 pounds.....	407	175,775
Cattle.....	18,086.....	4,522	792,325
Champagne.....	168 quarts.....		144
Cheese, etc.....	249 pounds.....		62
China and porcelain.....	34,512 pounds.....	17	17,256
Cigars, cigarettes, and cheroots.....	680 pounds.....		1,746
Clays, all other.....	134 tons.....	134	1,299
Coal.....	392 tons.....	392	1,650
Coffee.....	1,417,286 pounds.....	709	241,875
Copper:			
Old.....	8,102 pounds.....	4	810
Pigs, bars, etc.....	165 pounds.....		25
Cordials.....	87 gallons.....		182
Cotton cloth, colored.....	2,240 square yards.....		570
Cotton laces, curtains, etc.....	49,304 pieces.....	50	24,652
Cotton stockings.....	55,752 pairs.....	9	4,114
Creosote.....	4,386,021 gallons.....	186,964	397,362
Cured herring.....	48,000 pounds.....	24	3,624
Cyanide of soda.....	115,178 pounds.....	58	15,750
Earthenware, all other.....	54,513 pounds.....	27	8,177
Fish:			
In oil.....	3,817 cases.....	76	22,906
All other.....	50,000 pounds.....	25	5,001
Gin.....	1,493 gallons.....	7	2,192
Glycerine, crude.....	58,048 pounds.....	29	3,377
Hair, horse.....	244 pounds.....		162
Hides, cattle:			
Dry.....	985.....	11	5,056
Green or pickled.....	1,904.....	29	15,515
Hides and skins, all other.....	1,439 pounds.....		670
Hops.....	37,635 pounds.....	19	15,935
Horses.....	7.....	5	718
Iron and steel, all other manufactures of.....	8,870 pounds.....	4	1,774
Lead.....	807 pounds.....		16
Lumber, sawn.....	17,000 feet.....	34	2,091
Matting and mats.....	184,212 square yards.....	414	16,406
Motion-picture films, positives.....	26,295 linear feet.....		1,109
Oil:			
Crude.....	115,086,399 gallons.....	431,574	1,515,139
Olive.....	10,636 gallons.....	58	14,675
Onions.....	5,495 bushels.....	156	6,265
Paper, wrapping.....	339,870 pounds.....	170	8,738
Paper stock, all other.....	3,165,200 pounds.....	1,583	15,826
Rice, uncleaned.....	51,266 pounds.....	25	1,261
Rubber, India.....	303 pounds.....		188
Salt.....	448,000 pounds.....	224	1,017
Seeds, all other.....	43,910 pounds.....	22	17,564
Sisal grass.....	12,455 tons.....	12,455	464,822
Spices.....	161,937 pounds.....	81	28,356
Steel ingots and blooms.....	76,599 pounds.....	38	804
Sugar.....	87,965,791 pounds.....	43,963	3,136,636
Sugar-beet seed.....	93,562 pounds.....	47	5,948
Tea.....	5,000 pounds.....	2	1,883
Tobacco, leaf, all other.....	3,462 pounds.....	1	931
Toys, all other.....	69,698 pounds.....	35	34,849
Uncleaned human hair.....	53,049 pounds.....	26	8,254
Waters, mineral.....	6,504 quarts.....	7	744
Whisky.....	4,457 gallons.....	20	8,009
Wines, still.....	32,652 quarts.....	35	8,336
Do.....	3,414 gallons.....	15	1,915
Wood pulp.....	112 tons.....	112	3,475
Wood, all other manufactures of.....	24,450 pounds.....	12	7,336
Zinc blocks, pigs and old.....	3,470 pounds.....	1	84
Zinc ore and calamine.....	33,755 tons.....	33,755	542,953
Miscellaneous articles.....	1,021 tons.....	1,021	102,121
Total.....		763,325	8,384,479

Foreign imports, domestic exports, and coastwise trade—Continued.

DOMESTIC EXPORTS.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt, unmanufactured	56 tons	56	\$1,278
Automobiles	61	92	115,025
Bacon	95,248 pounds	47	11,025
Barley	2,087 bushels	50	1,377
Box shooks	56,400	282	7,492
Bran	321 tons	321	8,001
Broom corn	629 tons	629	52,723
Butter	954 pounds		273
Canned beef	433,352 pounds	216	76,700
Cartridges	3,421,000	95	106,051
Car wheels	500	165	3,724
Cement	502 barrels	95	1,056
Codfish	4,700 pounds	2	310
Copper, refined	4,483,846 pounds	2,242	831,753
Copper wire, old and scrap	96,365 pounds	48	14,370
Corn	778,069 bushels	21,796	533,487
Cotton	3,031,749 bales	757,937	156,811,884
Cottonseed cake	309,134,605 pounds	154,567	4,664,446
Cottonseed meal	42,823,485 pounds	21,412	614,519
Cottonseed oil	3,048,710 pounds	1,524	193,108
Cotton waste	3,091 pounds	1	213
Cotton wearing apparel, all other	57,515 pieces	58	23,006
Dried grains	293 tons	293	7,094
Eggs	540 dozen		123
Fertilizer, all other	1,344 tons	1,344	12,028
Firearms	2,087	15	27,131
Flour	276,951 barrels	27,141	1,735,504
Gasoline	44,647 gallons	134	5,493
Hams and shoulders	3,161 pounds	1	538
Harness and saddlery	36,913 pounds	18	31,376
Hay	61,507 tons	61,507	803,777
Hides	10,175 pounds	5	2,550
Horses	5,131	3,079	890,225
Iron and steel, manufactures of	46,000 pounds	23	5,513
Iron, scrap	7,759 tons	7,759	87,806
Lard	758,400 pounds	379	75,026
Lard compounds	477,204 pounds	238	38,710
Lard, neutral	132 pounds	16	
Lead	17,269,988 pounds	8,635	838,111
Lime, acetate of	13,500 pounds	7	131
Linters, cotton	27,116 bales	6,779	467,651
Liquor, malt	4,296 dozen quarts	64	8,548
Do.	600 gallons	3	230
Logs	368 M feet	736	14,063
Lumber	29,572 M feet	59,144	566,905
Machinery	307,144 pounds	153	76,788
Millfeed	450 tons	450	15,768
Mules	23	20	960
Naphtha, all other	800 gallons	2	144
Oats	57,228 bushels	916	28,658
Oil:			
Crude	520 gallons	2	30
Illuminating	90,000 gallons	315	8,550
Lubricating	70,513 gallons	282	11,461
Onions	1,808 bushels	51	2,512
Paint, mixed	730 gallons	4	558
Paper:			
Printing	117,871 pounds	59	3,253
Wrapping	158,836 pounds	79	6,204
Paraffin wax	515,999 pounds	258	14,901
Peanut cake	900,480 pounds	450	14,476
Peanut meal	57,000 pounds	28	750
Pipe	34,671 pounds	17	972
Potatoes	484 bushels	14	510
Rice	4,329,295 pounds	2,165	179,420
Salt	62,700 pounds	31	465
Sausage	1,756 pounds	1	238
Scrap brass	181,469 pounds	90	21,986
Shoes, leather	19,047 pairs	29	30,498
Shingles	350,000	44	1,050
Soap	135,075 pounds	67	4,509
Soap stock	464,160 pounds	232	23,208
Soda, salts and preparations of	444 tons	444	53,314
Spelter	22,949,986 pounds	11,475	3,324,685
Staves	1,988,870	9,944	329,082
Stearin	63,710 pounds	32	5,357
Steel:			
Bars	12,344,490 pounds	6,172	186,991
Billets	10,518 tons	10,518	231,472
Sulphur	2,117 tons	2,117	41,397
Sugar	4,100 tons	4,100	370

Foreign imports, domestic exports, and coastwise trade—Continued.

DOMESTIC EXPORTS—Continued.

Articles.	Amount in customary Units.	Amount in short tons.	Value.
Tar, turpentine, pitch.....	8 barrels.....	1	\$41
Ties, railroad.....	34,278.....	2,571	22,672
Timber, pitch pine.....	1,258,000 feet.....	2,516	25,053
Wheat.....	32,667,220 bushels.....	979,716	44,120,506
Whisky.....	114 gallons.....		370
Window glass.....	16,880 square feet.....	17	797
Wood, all other manufactures of.....	102,945 pounds.....	51	20,599
Wool, manufactures of.....	16 tons.....	16	19,869
Zinc:			
Manufactures of.....	24 tons.....	24	10,505
Sheet.....	36,580 pounds.....	18	5,400
Miscellaneous articles.....	1,315 tons.....	1,315	181,557
Total.....		2,175,291	218,671,691

COASTWISE TRADE.

Articles.	Short tons.	Value.
INBOUND.		
Agricultural implements and vehicles.....	526	\$157,800
Agricultural products, n. o. s.....	1,897	94,850
Ammunition.....	2,098	2,617,600
Asphaltum.....	1,169	30,300
Automobiles.....	108	144,000
Bags and bagging.....	31,733	2,490,630
Books, tablets, and book paper.....	3,285	1,642,500
Brass, copper, and articles of.....	293	102,550
Canned goods.....	29,046	3,485,520
Carpets, rugs, mats, and matting.....	426	17,040
Cement and articles of.....	8,967	86,670
Citrus fruits.....	1,327	38,810
Coal.....	36,146	216,576
Coffee.....	2,681	1,072,000
Copper, bullion, etc.....	2,981	1,043,350
Cordage, rope and twine.....	4,254	780,080
Cotton.....	8,898	2,135,520
Cotton ties.....	9,655	965,800
Dried fruits.....	100	20,000
Dried vegetables, including beans and peas.....	18	1,908
Dry goods.....	27,464	27,464,000
Fence.....	2,003	120,180
Fish.....	965	115,980
Forest products.....	124	2,480
Groceries.....	17,510	3,832,208
Hardware and cutlery.....	336	28,330
Iron and steel:		
Bar, band, and hoop.....	8,235	164,700
Billets, blooms, and pigs.....	1,247	24,940
Boiler plate and sheet.....	16,353	824,130
Bolts, nuts, washers, etc.....	1,027	71,880
Castings, chain and forgings.....	1,617	91,620
Heating apparatus, steam and hot water.....	67,463	67,463
Horse, mule, and ox shoes.....	2,223	211,620
Nails and wire.....	14,406	678,240
Pipe.....	14,853	831,708
Rope and cable.....	344	13,780
Steel rails.....	155	4,680
Structural.....	11,106	233,180
Other manufactures.....	17,567	3,493,400
Leather and leather goods.....	71	35,500
Liquors, wines, etc.....	2,301	330,150
Machinery:		
Pumps, etc.....	16,892	5,067,600
Electrical, etc.....	4,624	2,312,000
Mud shell.....	662,584	305,082
Naval stores.....	69	2,415
Nuts, edible.....	607	163,880
Oilcloth and linoleum.....	2,507	501,400
Oil, fuel.....	45,297	281,430
Oil, vegetable.....	209	24,085
Packing-house products.....	696	243,000
Paints and oils.....	5,294	635,380
Paper:		
Printing.....	21,469	1,180,780
Wrapping, wall, etc.....	5,729	343,740

Foreign imports, domestic exports, and coastwise trade—Continued.

COASTWISE TRADE—Continued

Articles.	Short tons.	Value.
INBOUND—continued.		
Potatoes and onions.....	17,787	\$799,906
Railroad equipment.....	8,870	533,200
Roofing material.....	2,189	109,450
Seeds.....	84	7,480
Soap and soap powders.....	6,372	433,298
Soda, sodium, lye, and potash.....	13,196	1,538,520
Stone, marble, and granite.....	5,659	565,900
Sugar.....	1,706	218,388
Tin orterne plate and articles of.....	1,374	89,310
Tobacco.....	265	281,430
Vinegar.....	1,216	48,640
Wool and mohair.....	147	96,490
Miscellaneous articles.....	148,188	14,815,800
Total.....	1,276,687	87,548,679
OUTBOUND.		
Agricultural products.....	10,049	502,450
Ammunition.....	72	35,400
Asphaltum.....	5,912	183,712
Automobiles.....	5	6,000
Barley and barley malt.....	21,701	787,834
Bags and bagging.....	213	23,430
Broom corn.....	525	52,500
Canned goods.....	33,447	4,013,640
Cement, and articles of.....	272	2,720
Cordage, rope, and twine.....	84	15,120
Corn.....	431	13,964
Copper, bullion.....	216,609	75,815,150
Cotton and cotton lintars.....	210,909	50,618,160
Cotton seed and products (not oil).....	5,845	169,508
Cottonseed oil.....	335	39,196
Dairy products.....	404	141,400
Dried fruits.....	34,924	6,984,800
Dried vegetables.....	26,503	2,809,318
Dry goods.....	1,029	719,600
Fertilizer, mineral, etc.....	3,588	35,880
Flour.....	3,238	252,564
Forest products.....	129,529	2,690,580
Hardware and cutlery.....	133	15,960
Hay.....	2,814	50,652
Hops.....	2,549	1,019,600
Lead.....	129	27,080
Lead and zinc:		
Bullion.....	88,031	17,606,300
Not bullion.....	824	206,009
Liquors and wines.....	8,172	1,225,800
Machinery, etc.....	201	50,260
Mill products, n. o. s.....	4,981	149,430
Naval stores.....	2,574	90,090
Oats.....	1,826	73,040
Oil, fuel.....	84,185	589,295
Onions and potatoes.....	25,294	1,137,780
Packing-house products.....	8,199	2,869,650
Paper, wrapping, etc.....	974	58,440
Pecans.....	704	190,080
Rice.....	24,868	1,989,440
Rubber and rubber goods.....	1,861	926,500
Sisal grass.....	1,426	128,340
Sugar.....	11,907	115,189
Wool and mohair.....	11,377	7,622,580
Miscellaneous articles.....	143,953	14,395,300
Total.....	1,121,586	196,139,738

RECAPITULATION.

Total imports.....	763,325	\$3,384,479
Total exports.....	2,175,291	218,671,091
Total coastwise trade (inbound).....	1,276,687	87,548,679
Total coastwise trade (outbound).....	1,121,586	196,139,738
Grand total.....	5,336,889	510,744,567

The above statistics were obtained as follows: Exports and imports from customhouse records; coastwise traffic from the Mallory and Southern Pacific Steamship Cos., the Galveston Wharf Co., and various oil companies and contractors in the mud shell business.

3. CHANNEL FROM GALVESTON HARBOR TO TEXAS CITY, TEX.

Dredging.—Under the contract with the Bowers Southern Dredging Co., of Galveston, Tex., approved December 18, 1913, the channel was completed on May 12, 1916, to a depth of 30 feet and width of 300 feet, removing a total of 1,016,936 cubic yards of material from within prescribed cross section, at a rate of 13½ cents per cubic yard—\$137,286.37; and 118,636 cubic yards from the next foot below prescribed, at a rate of 6½ cents per cubic yard—\$8,007.93—in section No. 1; and a total of 1,241,186 cubic yards from within prescribed cross section, at a rate of 8½ cents per cubic yard—\$102,397.86; and 147,434 cubic yards from the next foot below prescribed, at a rate of 4½ cents per cubic yard—\$6,081.65—in section No. 2, a total of \$253,773.81 under contract.

Shoaling having taken place in advance of the channel dredged by the contractor, the U. S. dredges *San Jacinto* and *Comstock* redredged the old channel for a distance of 14,900 feet and to a depth of 27 to 30 feet, removing a total of 258,780 cubic yards. The channel also having shoaled at the inner end, after completion to a depth of 30 feet on the contract, the United States dredges redredged for a total of 2,387 feet in restoring the channel to a depth of 30 feet and width of 300 feet, removing a total of 170,750 cubic yards.

Pile dike.—The strong current causing considerable erosion near the inner and outer ends of the pile dike, an emergency contract was entered into July 14, 1915, with William Moore, Texas City, Tex., for placing 8,000 tons of riprap as an apron to protect these sections from wave action. Work began under this contract February 21, 1915, and to end of fiscal year the contractor has placed a total of 4,873.42 tons as an apron on both sides of the earth dump, in the sections showing erosion between the inner and outer ends, at a cost of \$3.32 per ton in place—\$16,179.75—and a total of 129.65 tons were dumped along the sides of the dike near the passenger pier at inner end of dike, at a cost of \$2.70 per ton in place—\$350.05. The U. S. pipe-line dredges *Colonel A. M. Miller*, *Sam Houston*, and *San Jacinto* at different times deposited material on each side of the pile dike to protect same from wave action and teredo. The U. S. pipe-line dredge *Sam Houston* also partially completed channel between the Texas City dike and the dumps on the west side of the Houston Ship Channel, to provide a larger outflow for the strong current impinging against the Texas City dike. This work was interrupted by the hurricane of August 16–17, 1915, and has not as yet been completed. The excavated material was placed around the outer end of the dike. A total of 2,222,429 cubic yards were placed over the dike.

The total expended during the fiscal year was \$556,929.55, of which \$380,742.01 was for original work and \$176,187.54 for maintenance, including superintendence, inspection, and repairs at Fort Point depot. The ruling depth on June 30, 1916, was 23.5 feet at mean low tide, with an average depth of 26 to 30 feet except near inner end. The dredge, steel pontoons, barges, and other floating plant washed ashore by the hurricane of August 16–17, 1915, were recovered and repaired by the United States survey party at Texas City, Tex.

APPROPRIATIONS.

For previous projects (acts of Mar. 3, 1899, to July 25, 1912, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 456)---	\$610,000.00
For present project:	
Mar. 4, 1913-----	\$500,000.00
Aug. 1, 1914-----	900,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	25,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915, and Apr. 8, 1916)-----	100,000.00
July 27, 1916-----	185,000.00
	<hr/> 1,710,000.00
Total of appropriations-----	2,320,000.00
Sales of contact prints-----	11.85
	<hr/>
Grand total-----	2,320,011.85

CONTRACTS IN FORCE.

DREDGING.

Contractor: Bowers Southern Dredging Co., Galveston, Tex.
 Amount and character of work: Section 1, 4,422,000 cubic yards; section 2, 2,453,000 cubic yards.
 Rate: Section 1, 13½ cents per cubic yard; section 2, 8½ cents per cubic yard.
 Date of contract: December 13, 1913.
 Date of approval: December 18, 1913.
 Date of beginning work: April 18, 1914.
 Date of expiration: September 19, 1915 (time limit waived).
 Date completed: May 12, 1916.

DIKE WORK.

Contractor: William Moore, Texas City, Tex.
 Amount and character of work: (a) 1,000 tons riprap dumped alongside dike from barges; (b) 8,000 tons riprap placed on the dump as an apron.
 Rate: (a) \$2.70 per ton of 2,000 pounds in place; (b) \$3.32 per ton of 2,000 pounds in place.
 Date of contract: July 14, 1915.
 Date of approval: Emergency contract.
 Date of beginning work: August 8, 1915.
 Date of expiration: July 19, 1916.
 Completed at end of June, 1916: 55 per cent.

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Class.	Amount.	Net registered tonnage.	Passengers.
Foreign vessels in and out-----	246	414,852	511
Coastwise, American-----	100	203,054	.....
Barges-----	206	153,580	.....
Total-----	552	671,486	511

¹ Estimated.

Vessel classification—Continued.

FOREIGN EXPORTS.

Articles.	Short tons.	Value.
Cotton.....	125,393	\$80,094,330
Grain and products.....	7,010	329,470
Oil, lubricating, etc.....	477	21,465
Hay.....	17,144	308,522
Metal, refined copper, etc.....	5,397	1,963,500
Lumber.....	5,402	108,040
Machinery and iron articles.....	461	115,250
Merchandise, dry goods, etc.....	125	64,852
Miscellaneous.....	1,338	133,800
Total.....	162,657	\$33,139,379

FOREIGN IMPORTS.

Fuel oil.....	4,800	\$53,600
Merchandise.....	2,842	234,200
Total.....	7,642	\$17,800

COASTWISE TRADE.

Coal.....	42,274	\$221,938
Groceries.....	3,984	576,430
Construction material.....	3,486	174,380
Cotton.....	791	189,840
Agricultural implements.....	250	85,000
Grease, paints, etc.....	350	42,000
Hardware.....	4,480	1,357,440
Linoleum, carpets, etc.....	1,740	320,600
Machinery.....	300	75,000
Merchandise, clothing, etc.....	12,424	2,454,800
Miscellaneous articles.....	3,808	330,300
Refinery supplies.....	346	20,780
Shell.....	31,844	101,837
Wire articles.....	33,418	1,670,900
Total.....	139,490	\$4,011,255

RECAPITULATION.

Total exports.....	162,657	\$33,139,379
Total imports.....	7,642	\$17,800
Total coastwise.....	139,490	\$4,011,255
Grand total.....	309,789	\$41,468,434

The above statistics were obtained from the Texas City Terminal Co., and the Southern Steamship Co.

4. CHANNEL TO PORT BOLIVAR, TEX.

The U. S. seagoing dredge *Comstock* worked from November 5, 1915, to January 28, 1916, in removing the shoal caused by the hurricane of August 16-17, 1915, excavating a total of 176,400 cubic yards, at a total cost of \$16,160.39, restoring the channel to a depth of 24 feet and about 100 feet wide. The turning basin having shoaled on the east side next to the wharves to such an extent as to impede navigation, bids were invited under poster, circular letter, and advertisement for redredging the basin immediately in front of the entrance to each of the two slips to a depth of 25 feet. Contract was awarded to the Bowers Southern Dredging Co., Galveston, Tex., and work was begun on March 13 and completed March 31, 1916, making cuts through the shoal at the entrance of each slip to a

depth of 25 feet and 175 to 350 feet in width. A total of 70,683 cubic yards were removed from within prescribed cross section at 12½ cents per cubic yard, \$8,835.38, and 11,584 cubic yards from the next foot below prescribed at 6½ cents per cubic yard, \$724. A shoal having formed near the outer end of the channel, the U. S. pipe-line dredge *Colonel A. M. Miller* was placed on the work on May 9 and worked to May 16, 1916, redredging the channel to a depth of 24½ feet and a width of 150 feet for a distance of about 1,600 linear feet, removing a total of 56,867 cubic yards at a total cost of \$5,207.76. The sum of \$35,184.32 was expended during the year, including superintendence, office expenses, and repairs to Fort Point depot, all on maintenance. The ruling depth of June 30, 1916, was 24.5 feet.

APPROPRIATIONS.

For previous projects (acts Mar. 2, 1907, to Mar. 3, 1909, inclusive;
see H. Doc. No. 1491, 63d Cong., 3d sess, p. 456) ----- \$100,000.00

For present project:

June 25, 1910.....	\$91,080.00
Feb. 27, 1911.....	25,000.00
July 25, 1912.....	25,000.00
Mar. 4, 1913.....	50,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	15,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	40,000.00
July 27, 1916.....	50,000.00
	<hr/> 296,080.00

Total of appropriations..... 396,080.00

Sales of contract prints..... .70

Grand total..... 396,080.70

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Class.	Number.	Net registered tonnage.
Steam.....	40	90,000
Sail.....	15	15,000
Total.....	45	105,000

No passengers reported.

Freight traffic.

Articles.	Short tons.	Value.
Cattle and other live stock.....	2,375	\$475,000
Coal.....	700	5,600
Cotton.....	3,294	790,680
Cottonseed cake.....	7,365	213,585
Feed and grain.....	4,404	88,080
Flour.....	1,400	109,200
Forest products.....	109,995	2,183,500
Household goods.....	232	23,200
Oil and creosotes.....	3,745	29,960
Rice, rough.....	2,900	116,000
Shell.....	7,250	4,350
Vegetables.....	3,200	386,400
Wire, nails, etc.....	5,750	230,000
Water.....	1,100	330
Miscellaneous.....	29,040	2,904,000
Total.....	182,450	7,559,765

The Port Bolivar ferry makes two regular round trips a day between Galveston and Port Bolivar with passenger trains and averages one round trip a day with freight tonnage.

The above statistics were obtained from the foreign freight agent of the Gulf, Colorado & Santa Fe Railway Co., who handle the business of this port, and he states that they are to a certain extent estimated, as all records were destroyed during the storm of August, 1915. This storm damaged the railroad leading into Port Bolivar for a distance of 27 miles, damaged the terminals, and sunk the transfer barge. The terminals and barge are in operation again, while the railroad is being rebuilt.

5. HOUSTON SHIP CHANNEL, TEX.

DIVISION 1 (BOLIVAR ROADS TO MORGAN BEACON, 5½ MILES BELOW MORGAN POINT).

The U. S. pipe-line dredge *San Jacinto* worked from July 1 to August 16, 1916, redredging the channel in lower Galveston Bay for a distance of 29,225 linear feet. From August 16 to December 8, 1915, the dredge was laid up, undergoing repairs on account of the damage received during the hurricane of August 16-17, 1915, and while doing some emergency dredging in the Texas City channel. From December 8, 1915, to February 28, 1916, this dredge worked in upper Galveston Bay, redredging a distance of 36,660 feet, removing a total of 2,519,298 cubic yards, at a total cost of \$64,423.71. The U. S. pipe-line dredge *Colonel A. M. Miller* dredged a small channel alongside of and floated the U. S. pipe-line dredge *San Jacinto*, which had been stranded in shallow water by the hurricane of August 16-17, 1915, and then redredged a section of the channel 8,500 feet long near lower end in Galveston Bay, removing a total of 220,000 cubic yards from September 1 to 30, 1915, at a cost of \$7,432.87. The U. S. pipe-line dredge *Sam Houston*, after undergoing repairs to damage caused by the hurricane of August 16-17, 1915, began work on March 8, 1916, in upper Galveston Bay and redredged to the upper end of this division, a distance of about 1 mile, removing a total of 188,969 cubic yards, at a total cost of \$4,310.51. The U. S. derrick barge *No. 1* worked from December 23, 1915, to January 19, 1916, replacing the single-stick creosoted pile beacons across Galveston Bay that were destroyed in the hurricane of August 16-17, 1915, 36 beacons being replaced, at a total cost of \$2,338.21, including cost of creosoted piles. Ruling depth on June 12, 1916, was 25.2 feet.

DIVISION 2 (MORGAN BEACON TO VINCES BAYOU).

The U. S. pipe-line dredge *Sam Houston* worked from March 19, 1916, to end of fiscal year in redredging the channel in upper Galveston Bay near Morgan Point for a distance of 25,789 linear feet, removing a total of 1,207,997 cubic yards of material at a total cost of \$41,542.56, restoring the channel to a depth of 25 feet at mean low tide and width of about 150 feet. The U. S. derrick barge *No. 1* replaced 15 beacons in this division and removed 42 snags and other obstructions at a cost of \$646.96. The ruling depth on June 12, .

1916, from Morgan Beacon to Morgan Point was 25.4 feet and from Morgan Point to upper end of the division at mouth of Vines Bayou the ruling depth was 25.6 feet.

DIVISION 3 (VINES BAYOU TO TURNING BASIN).

The U. S. pipe-line dredge *San Jacinto* began work on this division March 1, 1916, and to end of fiscal year had redredged the channel and turning basin for a distance of 7,125 feet, restoring the channel to a depth of over 25 feet at mean low tide and width of about 100 feet, and the turning basin to a width of 600 feet, removing a total of 497,809 cubic yards at a total cost of \$58,461.20. The U. S. derrick barge *No. 1* worked from December 6 to 15, 1915, and from February 14 to March 22, 1916, removing a total of 752 stumps, snags, and other obstructions from the channel and banks at a total cost of \$1,534.01. The ruling depth on June 22, 1916, from Vines Bayou to the lower end of Long Reach was 21 feet; thence over all the dredged portion of the channel to and including the turning basin the depths were over 26 feet.

HOUSTON DIVISION (TURNING BASIN TO MAIN STREET, HOUSTON, TEX.).

No work has been done on this section of the channel during the fiscal year. The ruling depth on June 22, 1916, was 7 feet.

MISCELLANEOUS.

The U. S. gas tug *E. M. Hartrick* was completed in May, 1916, under contract, at a cost of \$13,150.

The United States survey party recovered barges, steel pontoons, anchor flats, etc., washed ashore during the hurricane of August 16-17, 1915, at a total cost of \$1,496.01, and rebuilt the U. S. quarter boat *No. 1*, which was badly damaged during the storm, at a cost of \$4,372.99, including equipment, and the machinery was purchased and erected for operating a sand-blast outfit, and a small marine ways constructed on the United States reservation at Morgan Point for the cleaning and repair of steel pontoons, small launches, etc., at a total cost of \$4,069.10, and placed in operation on June 26, 1916. The city of Houston, under contract with the Atlantic, Gulf & Pacific Co., of New York, has excavated a strip about 200 feet wide and 1,800 feet long on the south side of the turning basin for the purpose of constructing municipal docks and warehouses, and also excavated a strip about 300 feet wide and 800 feet long on the north side of the turning basin, and has built an 850-foot creosoted pile wharf and about 5.75 acres of concrete cotton sheds, at a total cost, according to figures furnished by them, of \$789,681. Total cost of all work on this improvement during the fiscal year was \$329,361.63, all for maintenance, including \$75,433.54 as cost of repairs on account of damage done to floating plant and Fort Point depot by hurricane of August 16-17, 1915.

APPROPRIATIONS.

SHIP CHANNEL IN GALVESTON BAY, TEX.

For previous projects (acts June 10, 1872, to June 3, 1896, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 455)----- \$849, 016. 85

BUFFALO BAYOU, TEX.

For previous projects (acts Mar. 3, 1881, to June 3, 1896, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 455)----- 228, 750. 00

Total previous projects----- 1, 077, 766. 85

GALVESTON SHIP CHANNEL AND BUFFALO BAYOU.

For present project:

Mar. 3, 1899-----	\$300, 000. 00
June 13, 1902-----	300, 000. 00
Mar. 3, 1903-----	500, 000. 00
Apr. 28, 1904-----	200, 000. 00
Mar. 3, 1905-----	200, 000. 00
June 30, 1906-----	200, 000. 00
Mar. 2, 1907-----	200, 000. 00
May 27, 1908-----	145, 000. 00
Mar. 3, 1909-----	100, 000. 00
Mar. 4, 1909-----	55, 000. 00
June 25, 1910-----	300, 000. 00
June 23, 1913-----	950, 000. 00
Aug. 1, 1914-----	200, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	110, 000. 00
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	200, 000. 00
July 27, 1916-----	250, 000. 00

Total-----	4, 210, 000. 00
Withdrawn-----	361. 10

Total-----	4, 209, 638. 90
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In addition to the above appropriations by Congress,
the following amounts have been received:

Proceeds of sales of condemned property-----	291. 02
Receipts from sales of contact prints-----	275. 33
Deposited by city of Houston-----	1, 625. 78

Total-----	4, 211, 881. 08
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PRIVATE FUNDS.

Funds contributed by the Harris County Houston Ship Channel Navigation District-----	1, 406, 297. 83
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Grand total-----	6, 695, 895. 71
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CONTRACTS IN FORCE.

CONSTRUCTION OF DREDGES "SAM HOUSTON" AND "SAN JACINTO."

Contractor: Bowers Southern Dredging Co., Galveston, Tex.
Amount and character of work: Two wooden-hull hydraulic dredges, complete.

Rate: \$321,000 for the two dredges.

Date of approval: May 9, 1914.

Date of beginning work: May 26, 1914.

Date of expiration: May 16, 1915.

Date completed: *San Jacinto*, April 17, 1916; *Sam Houston*, July 19, 1915.

CONSTRUCTION OF MOTOR DREDGE TENDER.

Contractor: John F. Bell Co. (Inc.), Morehead City, N. C.

Amount and character of work: One first-class motor dredge tender, complete as specified.

Rate: \$13,450 delivered at Galveston, or \$12,450 delivered at works of contractor.

Date of contract: April 6, 1915.

Date of approval: April 17, 1915.

Date of beginning work: May 7, 1915.

Date of expiration: October 27, 1915.

Contractor failed and tender completed by United States.

CONSTRUCTION OF OIL AND WATER BARGES.

Contractor: Thomas M. Favre, Gulfport, Miss.

Amount and character of work: Two first-class wooden-hull oil and water barges, complete as specified.

Rate: \$17,310 for the two barges delivered at Galveston, Tex., or \$16,110 delivered at works of the contractor.

Date of contract: April 16, 1915.

Date of approval: Emergency contract.

Date of beginning of work: May 1, 1915.

Date of expiration: August 19, 1915 (time limit waived).

Date completed: August 23, 1915.

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Class.	Ameri- can.	Net registered tonnage.	Passen- gers.
Registered:			
Steam.....	28	47,413	.....
Gas screw.....	1,841	29,268	3,970
Barges.....	14	5,792	.....
Unregistered:			
Steam.....	6	17,200	.....
Barges.....	165	149,500	.....
Total.....	2,054	139,173	3,970

* Estimated.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
INBOUND.			OUTBOUND—continued.		
<i>Foreign and coastwise.</i>			<i>Foreign and coastwise—Continued.</i>		
Ammunition.....	197	\$236,300	Rosin.....	200	\$9,100
Bagging.....	821	90,310	Miscellaneous.....	1,254	225,400
Canned goods.....	2,118	264,160	Total.....	58,337	5,630,296
Cement.....	98	980	LOCAL FREIGHT TRAFFIC.		
Coal.....	6,080	36,000	<i>To and from points on the channel and adjacent waterways.</i>		
Cordage.....	306	55,440	Beer and ice.....	5,000	84,000
Coffee.....	506	202,400	Brick and tiling.....	900	6,400
Dry goods.....	313	224,750	Coal.....	1,200	9,600
Groceries.....	1,867	405,540	Cordwood.....	450	2,700
Hardware.....	2,037	316,240	Cotton.....	900	216,000
Iron and steel:			Crushed rock and gravel.....	800	1,200
Unmanufactured.....	1,262	72,616	Fish and oysters.....	2,100	68,000
Manufactured.....	5,892	1,595,000	Fruits and vegetables.....	4,260	189,000
Lumber and shingles.....	197,000	2,940,000	Fuel oil.....	24,508	174,500
Machinery.....	47	11,750	Furniture and pianos.....	600	60,000
Oilcloth and linoleum.....	86	17,360	Grain and feed.....	33,900	845,000
Oil:			Groceries and provisions.....	32,900	7,468,000
Fuel.....	30,210	448,380	Hardware and machinery.....	17,380	1,780,480
Lubricating.....	292	18,920	Hay.....	1,700	17,000
Paints and oils.....	970	126,100	Junk.....	2,000	12,000
Paper, printing.....	1,006	55,530	Lime and cement.....	8,400	35,000
Phosphate rock.....	5,414	21,600	Lumber and shingles.....	134,300	2,680,000
Rice, rough.....	51,500	1,269,000	Oil and gasoline.....	12,800	640,000
Roofing material.....	573	33,418	Rice, rough.....	28,008	1,120,000
Sand.....	310,000	282,500	Sand.....	240,080	185,000
Shell.....	350,000	210,000	Shell.....	25,000	15,000
Soda, lye and potash.....	522	59,000	Miscellaneous.....	360	17,500
Sugar.....	72	9,216	Total.....	568,900	15,505,900
Vinegar.....	360	14,000	RECAPITULATION.		
Miscellaneous.....	4,379	437,900	Inbound, foreign and coastwise.....	1,004,110	19,368,720
Total.....	1,004,110	10,200,720	Outbound, foreign and coastwise.....	58,337	5,630,296
OUTBOUND.			Local freight traffic.....	508,900	15,505,900
<i>Foreign and coastwise.</i>			Grand total.....	1,666,347	31,405,916
Cotton.....	21,288	5,108,120			
Cottonseed meal.....	2,316	67,164			
Lumber.....	160	2,260			
Milo maize.....	47	940			
Oil, fuel.....	31,564	194,542			
Pecans.....	66	17,820			
Preserved figs.....	20	4,800			
Rice and rice products.....	1,322	106,160			

The above statistics were obtained from the harbor master and city wharf master, Houston, Tex.

6. WEST GALVESTON BAY CHANNEL; TURTLE BAYOU; TRINITY RIVER; ANAHUAC CHANNEL; OYSTER CREEK; CEDAR, CHOCOLATE, AND BASTROP BAYOUS, TEX., INCLUDING MOUTHS OF ADJACENT STREAMS.

(A) CHANNEL ACROSS HANNA REEF—EAST BAY BAYOU.

No work has been performed during the fiscal year. A balance of \$24.15 was expended in repairs to launches. Ruling depth across the reef was 4½ feet on June 30, 1916.

APPROPRIATIONS.

For present project:

June 13, 1902 (allotted July 8, 1902).....	\$681.91
Mar. 3, 1909 (allotted Apr. 1, 1909).....	1,794.11
June 25, 1910 (allotted Aug. 1, 1910).....	823.65
Mar. 4, 1915 (allotted Aug. 12, 1915).....	500.00
July 27, 1916.....	

Total..... 3,799.67

COMMERCIAL STATISTICS.

No commercial statistics available.

(B) DOUBLE BAYOU.

The U. S. derrick barge *No. 1* worked from November 9 to 15, 1915, cleaning snags and other obstructions from the upper end of the south fork of this bayou, removing a total of 36 large snags, 17 small snags, 20 overhanging trees, and the wreckage of a small house which was carried into the bayou by the hurricane of August 16-17, 1915, at a total cost of \$372.12, all for maintenance. Ruling depth on June 30, 1916, was 3.2 feet; the hurricane of August 16-17, 1915, having caused considerable shoaling.

APPROPRIATIONS.

For present project:

June 13, 1902 (allotted July 8, 1902)	\$6,952.65
Mar. 2, 1907 (allotted Mar. 18, 1907)	3,598.50
Mar. 3, 1909 (allotted Apr. 1, 1909)	4,733.06
June 25, 1910 (allotted Aug. 2, 1910)	3,978.88
Feb. 27, 1911 (allotted Apr. 21, 1911)	5,000.00
July 25, 1912 (allotted Jan. 28, 1914)	4,500.00
Mar. 4, 1915 (allotted Sept. 3, 1915)	500.00
Total	29,281.09
Sales of condemned property	16.84
Grand total	29,277.83

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

About 20 sailboats with auxiliary engines use this stream. These boats average about 10 tons each. The total number of trips made by these boats is unobtainable. A number of barges are also used.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Bacon	5	\$1,500	Hides	10	\$4,900
Bricks	50	200	Hogs	25	4,500
Cattle	20	3,000	Ice	600	3,600
Charcoal	2	20	Lumber	400	4,800
Chickens	9	1,800	Machinery	75	15,750
Cotton	40	9,600	Oats	180	7,200
Cement	10	100	Rice	2,200	88,000
Corn	880	28,512	Shingles	25	750
Eggs	2	600	Sugar cane	250	5,000
Gasoline	60	3,960	Vegetables	550	66,000
General merchandise	50	5,000			
Groceries	200	57,200	Total	5,853	316,792
Hay	150	1,800			

The above statistics were obtained from boat owners who were engaged in handling the traffic of the bayou.

¹ Originally allotted \$5,000; \$500 suballotted to Dickinson Bayou.

(C) ANAHUAC CHANNEL.

The U. S. derrick barge *No. 1* worked from August 1 to 16 in removing a total of 122 large and 54 small snags from the channel. The hurricane of August 16-17, 1915, carried the derrick ashore about $1\frac{1}{2}$ miles from ordinary water, and the crew worked to October 28, 1915, in refloating the plant, dragging it over the county road for about $1\frac{1}{2}$ miles under its own power. The cost of the work, including necessary repairs, was \$4,495.95, all charged to maintenance.

The ruling depth in channel on June 30, 1916, was 4.3 feet at mean low tide, considerable shoaling having been caused by the hurricane of August 16-17, 1915.

APPROPRIATIONS.

Mar. 3, 1905 (allotted Apr. 11, 1905)	\$6,100.00
Mar. 2, 1907 (allotted Mar. 18, 1907)	6,000.00
Mar. 3, 1909 (allotted Apr. 1, 1909)	1,949.78
June 25, 1910 (allotted Aug. 2, 1910)	692.19
Feb. 27, 1911 (allotted Apr. 21, 1911)	3,000.00
Mar. 4, 1913 (allotted Jan. 28, 1914)	3,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	3,800.00
Mar. 4, 1915 (allotted Sept. 9, 1915)	2,500.00
July 27, 1916	
Total	27,041.95

COMMERCIAL STATISTICS.

The traffic shown under "Mouth of Trinity River" and "Turtle Bayou," together with traffic to and from the town of Anahuac, of which no statistics could be obtained, use this channel. Great damage was caused to the wharves at the town of Anahuac by the storm of August, 1915. The traffic carried through this channel reaches a valuation of a half million dollars annually.

(D) MOUTH OF TRINITY RIVER.

No work was performed during the year. The sum of \$9.40 was charged to this improvement and taken up by the U. S. pipe-line dredge *San Bernard* on account of repairs.

The ruling depth on June 30, 1916, was 5.2 feet.

APPROPRIATIONS.

For previous projects (acts of Aug. 30, 1852, to June 3, 1896, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 575)	\$80,000.00
For present project:	
June 13, 1902 (allotted July 8, 1902)	\$62.97
Mar. 3, 1905 (allotted Apr. 1, 1905)	3,800.00
Mar. 2, 1907 (allotted Mar. 18, 1907)	658.08
Mar. 3, 1909 (allotted Apr. 1, 1909)	3,590.39
June 25, 1910 (allotted Aug. 2, 1910)	500.00
Feb. 27, 1911 (allotted Apr. 21, 1911)	¹ 1,500.00
July 27, 1916	
Total appropriations	10,111.39
Sales of condemned property	15.18
Grand total	90,126.57

¹ Originally allotted \$2,000; \$500 suballotted to Dickinson Bayou.

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

About 17 gasoline boats and 10 barges use this waterway. The total number of trips made by these boats is unobtainable.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Bricks.....	10	\$100	Gasoline.....	22	\$1,600
Charcoal.....	60	600	General merchandise.....	900	90,000
Chickens.....	7	1,300	Hides.....	8	4,080
Cotton.....	12	3,120	Hogs.....	20	3,000
Cordwood.....	340	1,700	Ice.....	76	450
Corn, oats, and foodstuffs ..	300	8,000	Lumber.....	1,763	20,713
Eggs.....	60	14,000	Vegetables.....	60	6,000
Fuel oil.....	1,067	11,000			
Garden truck.....	42	6,000	Total.....	5,837	171,263

The above information was obtained from the C. E. Cummings Export Lumber Co. and others interested in the waterway.

The rice of this section moves out through Cedar Bayou on account of shallow water in this stream.

(E) TURTLE BAYOU.

The channel having shoaled to a depth of 2.7 feet and obstructing navigation, and there being no Government plant available for the work, bids were invited under poster, circular letter, and advertisement for dredging the channel. The contract was awarded to John Jacobson, of Texas City, Tex., and operations began February 9 and were completed February 20, 1916. The channel was dredged for its entire length of 15,900 linear feet to depth of from 5.7 to 9.2 feet and width of 40 to 55 feet, removing a total of 116,900 cubic yards for the lump-sum price of \$4,000.

The ruling depth on June 30, 1916, was 5.7 feet. The cost of the work was \$4,841.21, all for maintenance, including \$500 for repairs to the damage caused by storm to the U. S. dredge *San Bernard* and \$261.04 outstanding liability from last year.

APPROPRIATIONS.

For present project:

June 25, 1910 (allotted Aug. 2, 1910).....	\$10,000.00
Feb. 27, 1911 (allotted Dec. 13, 1912).....	4,000.00
July 25, 1912 (allotted Jan. 28, 1914).....	3,000.00
Mar. 4, 1915 (allotted Jan. 28, 1916).....	3,100.00
July 27, 1916.....	

Total..... 20,100.00

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

About 10 gasoline towboats, 8 barges, and a number of sailboats use this waterway. The total number of trips made by these boats is unobtainable.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Bacon.....	2	\$800	Lumber.....	7,500	\$108,000
Bricks.....	100	400	Machinery.....	150	15,000
Charcoal.....	150	1,500	Oats.....	65	2,000
Chickens.....	13	2,500	Paints and oils.....	20	2,400
Cordwood.....	1,000	4,000	Sharp sand.....	600	375
Cement.....	20	200	Shingles.....	10	400
Corn.....	56	1,814	Sirup.....	8	840
Eggs.....	1	300	Sugar cane.....	2	40
Fuel oil.....	2,000	12,000	Wool.....	3	1,400
Gasoline.....	18	800	Vegetables.....	22	2,640
General merchandise.....	2,000	100,000	Rough rice.....	2,000	80,000
Hay.....	35	500			
Ice.....	10	50	Total.....	15,791	338,819
Lime.....	6	60			

The above statistics were obtained from Mr. C. J. Robertson, a lumberman on the bayou, and the Stowell Canal Co.

(F) CEDAR BAYOU.

No work was performed on this channel during the year. The sum of \$9.55 was charged to this allotment on account of repairs to the U. S. dredge *San Bernard*. Ruling depth on June 30, 1916, was 3.9 feet, the hurricane of August 16-17, 1915, having caused considerable shoaling.

APPROPRIATIONS.

For present project:	
Sept. 19, 1890.....	\$18,150.00
July 13, 1892.....	14,000.00
July 13, 1902.....	5,000.00
Mar. 3, 1905 (allotted Apr. 1, 1905).....	2,100.00
Mar. 2, 1907 (allotted Mar. 18, 1907).....	4,785.52
Mar. 3, 1909 (allotted Apr. 1, 1909).....	4,781.47
June 25, 1910 (allotted Aug. 2, 1910).....	1,040.11
July 25, 1912 (allotted Jan. 28, 1914).....	3,100.00
Mar. 4, 1913 (allotted Jan. 28, 1914).....	4,475.00
July 27, 1916.....	
Total of appropriations.....	57,482.10
Sales of condemned property.....	1,441.83
Grand total.....	58,873.93

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

About 15 gasoline towboats and a large number of barges and smaller boats use this waterway. The total number of trips made by these boats is unobtainable.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Cotton.....	310	\$74,400	Oil and gasoline.....	300	\$40,000
Lumber and shingles.....	9,000	180,000	Brick.....	11,000	55,000
Hardware and machinery.....	200	40,000	Shell.....	50,000	50,000
Groceries and provisions.....	4,000	200,000	Cordwood.....	1,000	5,000
Rough rice.....	13,000	520,000			
Grain and feed.....	7,000	175,000	Total.....	96,310	1,339,400

The above statistics were furnished by the city wharfmaster at Houston, Tex., who keeps a record of the traffic which uses these different streams in connection with the Houston Ship Channel.

(G) CLEAR CREEK.

No work was done on this waterway during the year. Ruling depth on June 30, 1916, was 5 feet, at entrance and 3 feet in channel across lake, the hurricane of August 16-17, 1915, having filled the channel considerably.

APPROPRIATIONS.

For present project:

June 13, 1902 (allotted July 8, 1902)-----	\$2. 80
Mar. 2, 1907 (allotted Mar. 18, 1907)-----	10, 487. 88
Mar. 3, 1909 (allotted Apr. 1, 1909)-----	5, 599. 08
June 25, 1910 (allotted Aug. 2, 1910)-----	11, 890. 97
Mar. 4, 1913 (allotted Jan. 28, 1914)-----	7, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	2, 000. 00
July 27, 1916-----	
Total-----	86, 480. 16

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

No vessel classification could be obtained. Gasoline towboats and barges are engaged in the traffic of this stream.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Fish.....	5	\$750	Oysters.....	25	\$750
Fuel oil.....	100	700	Rice.....	30	1, 200
Garden truck.....	25	2, 750	Miscellaneous articles.....	150	15, 000
Hay.....	200	2, 400			
Mud shell.....	8, 035	3, 345	Total.....	8, 570	25, 898

The above information was obtained from Messrs. Hanson & Sons, of Galveston, who handled the mud-shell, and from other users of the waterway.

(H) DICKINSON BAYOU.

No work was performed on this waterway during the year. The sum of \$350.93 was charged to this allotment on account of repairs to the U. S. dredge *San Bernard*. Ruling depth on June 30, 1916, was 2.1 feet, the hurricane of August 16-17, 1915, having shoaled the entrance channel.

APPROPRIATIONS.

For present project:

Mar. 2, 1907 (allotted Mar. 18, 1907)-----	\$8, 089. 65
Mar. 3, 1909 (allotted Apr. 1, 1909)-----	3, 981. 29
June 25, 1910 (allotted Aug. 2, 1910)-----	8, 699. 83
Feb. 27, 1911 (allotted Mar. 31, 1915)-----	500. 00
July 25, 1912 (allotted Sept. 8, 1913, and Mar. 31, 1915)-----	4, 500. 00
Oct. 2, 1914 (allotted Oct. 7, 1914, and Mar. 31, 1915)-----	3, 200. 00

Total-----	28, 920. 77
Proceeds of sales of condemned property-----	89. 46

Grand total----- 29, 010. 23

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

No vessel classification could be obtained. Gasoline towboats and barges are engaged in the traffic of this stream. About 400 launches were reported as using the stream.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Agricultural implements.....	2	\$200	Mud shell.....	725	\$544
Cordwood.....	400	400	Pontoons.....	1	100
Gasoline.....	1	50	Sharp sand.....	200	245
Household goods.....	2	150	Miscellaneous articles.....	9	900
Lumber and logs.....	47	705			
Live stock.....	1	90	Total.....	1,391	3,474
Oysters.....	3	90			

Passengers reported, 2,090.

The above statistics were obtained from Mr. G. C. Angier, who states that all the traffic was not reported.

(I) CHOCOLATE BAYOU.

No work performed on this waterway during the year. The sum of \$574.93 was charged to this allotment on account of repairs to snag boat *Guadalupe*, and other miscellaneous expenses. Ruling depth on June 30, 1916, was 2½ feet.

APPROPRIATIONS.

For present project:

Mar. 2, 1907 (allotted Mar. 18, 1907).....	\$6,512.22
Mar. 3, 1909 (allotted Apr. 1, 1909).....	760.82
June 25, 1910 (allotted Aug. 2, 1910).....	4,853.25
Feb. 27, 1911 (allotted May 24, 1912).....	3,500.00
Feb. 27, 1911 (allotted Aug. 14, 1912).....	5,000.00
July 25, 1912 (allotted Sept. 8, 1913).....	2,400.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	5,000.00
July 27, 1916.....	-----
Total	28,028.29

COMMERCIAL STATISTICS.

No detailed record of the commerce of this stream could be obtained. A large amount of hay and garden truck is taken out and groceries and general merchandise brought into this section through this stream.

(J) BASTROP BAYOU.

No work has been performed on this channel during the year. The sum of \$3,124.79 was charged to this allotment on account of the repairs to the storm damage on the U. S. dredge *San Bernard* and payment of \$119.70 outstanding liabilities from last year. Ruling depth on June 30, 1916, was 5 feet.

APPROPRIATIONS.

For present project:

Mar. 2, 1907 (allotted Mar. 18, 1907)-----	\$9,920.22
Mar. 8, 1909 (allotted Apr. 1, 1909)-----	7,810.07
Oct. 2, 1914 (allotted Oct. 7, 1914, and Apr. 13, 1915)-----	7,000.00
July 27, 1916-----	
Total -----	24,730.29

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

No vessel classification could be obtained. Gasoline towboats and barges are used for moving the traffic on this waterway.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Cordwood and logs.....	50	\$400	Hay.....	1,000	\$14,000
Cotton.....	150	36,000	Machinery.....	5	1,000
Feed stuff.....	50	1,000	Rough rice.....	3,600	144,000
Fish and oysters.....	208	18,720	Total	5,730	219,780
Fuel oil.....	667	4,669			

The above statistics were obtained from Mr. A. R. Rucks, county judge, Brazoria County, Angleton, Tex.

(K) OYSTER CREEK.

This channel was redredged by the U. S. pipe-line dredge *San Bernard* on January 6 to 18, 1916, for a distance of 10,325 linear feet, above its mouth, to a depth of 5 feet at mean low tide and width of 40 feet, removing a total of 66,883 cubic yards of material, at a total cost of \$3,977.85. Ruling depth on June 30, 1916, was 5.5 feet.

APPROPRIATIONS.

For present project:

June 25, 1910 (allotted Aug. 2, 1910)-----	\$8,021.12
July 25, 1912 (allotted Nov. 25, 1913)-----	2,500.00
Oct. 2, 1914 (allotted Apr. 13, 1915)-----	2,000.00
Mar. 4, 1915 (allotted Jan. 14, 1916)-----	2,000.00
Total -----	14,521.12

COMMERCIAL STATISTICS.

No commercial statistics available.

APPROPRIATIONS.

FOR PRESENT PROJECT.

Dredge *Capt. C. W. Howell*:

Mar. 8, 1909 (allotted Apr. 1, 1909)-----	\$15,000.00
---	-------------

Dredge *Gen. H. M. Robert*:

Mar. 8, 1899-----	65,000.00
June 13, 1902-----	2,992.51
Total -----	67,992.51

Dredge *San Bernard*:

Feb. 27, 1911.....	\$2,500.00
June 25, 1912.....	5,000.00

Total.....	7,500.00
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Repair and maintenance to plant:

Oct. 2, 1914 (allotted Oct. 7, 1914).....	2,000.00
---	----------

Unallotted:

Mar. 4, 1915.....	11,400.00
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7. INLAND WATERWAY ON THE COAST OF TEXAS.

(A) WEST GALVESTON BAY AND BRAZOS RIVER CANAL.

The U. S. pipe-line dredge *San Bernard* redredged the west end of the canal for a distance of 40,401 feet to a depth of 5 feet and width of 40 feet and removed a total of 428,168 cubic yards of material, at a cost of \$19,253.34. The dredge *San Bernard* was damaged by the hurricane of August 16-17, 1915, and was laid up for repairs from August 16 to December 1, 1915. The dredge having been washed ashore had to be floated by dredging a cut into the bank. The U. S. pipe-line dredge *Guadalupe* worked from November 17 to 30, 1915, redredging a shoal at the entrance to Mud Island cut at the lower end of West Galveston Bay, removing a total of 8,396 cubic yards at a cost of \$3,208.92. The sum of \$29,243.75 was expended, all for maintenance. The ruling depth on June 30, 1916, was 4 feet.

APPROPRIATIONS.

CHANNEL IN WEST GALVESTON BAY.

For previous projects (acts of July 13, 1892, to Mar. 3, 1905, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 576).....	\$35,000.00
Sales of condemned property.....	58.34
Sales of contact prints.....	1.35
Total.....	35,059.69

GALVESTON AND BRAZOS CANAL.

For previous project (acts June 13, 1902, to Mar. 3, 1905, inclusive; see H. Doc. 1491, 63d Cong., 3d sess., p. 574).....	67,307.66
Total for previous projects.....	102,367.35

For present project:

Mar. 2, 1907.....	\$59,500.00
May 27, 1908.....	92,029.00
Mar. 3, 1909 (allotted Mar. 27, 1909).....	37,721.65
Mar. 4, 1909.....	1,318.18
July 25, 1912.....	10,000.00
Mar. 4, 1913.....	10,000.00
Mar. 4, 1913 (allotted Mar. 9, 1914).....	10,525.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	15,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915, and Mar. 11, 1916).....	20,000.00
July 27, 1916.....	15,000.00
	271,093.83
	873,461.18

Sales of contact prints.....	\$14. 72
Sales of condemned property.....	75. 28
Collected from Postal Telegraph Cable Co.....	500. 00
Sales of hull and machinery of dredge <i>Robert</i>	2, 980. 38
Grand total of appropriations.....	878, 401. 49
Grand total of receipts from all sources.....	377, 031. 54

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered, all classes.....	4, 643	1 27, 858

¹ Estimated.

No record of passengers.

No detailed record of tonnage passing through this section of the inland waterway was obtainable. The traffic shown under section Brazos River to Matagorda Bay either originates at Galveston or has its destination at Galveston. The traffic shown under Bastrop and that using Chocolate Bayou and Oyster Creek, of which no record could be obtained, also uses this section of the inland waterway.

The record of boats was obtained from the Gulf, Colorado & Santa Fe Railway Co., who employ the drawbridge tender at the Galveston Causeway.

(B) CHANNEL BETWEEN BRAZOS RIVER AND MATAGORDA BAY.

The U. S. derrick barge *No. 1* worked from July 1 to 26, 1915, dredging the cut from its entrance to the Brazos River to a point about 600 feet west of Quintana Bridge, a distance of 2,050 feet, removing a total of 12,246 cubic yards of material and a few snags, leaving the channel about 5½ feet deep and 40 feet wide. The derrick barge also removed a sunken barge from the canal near the mouth of San Bernard River. The U. S. pipe-line dredge *San Bernard* worked from January 31 to February 21, 1916, and May 19 to end of fiscal year in dredging the channel from the entrance at Brazos River westward, advancing a total distance of 13,997 feet and removing a total of 299,539 cubic yards at a total cost of \$20,555.25. The ruling depth over this section of the canal on June 30, 1916, was 3.5 feet over section not dredged. Total cost of all work, including superintendence, inspection, office expenses, etc., was \$24,990.30, all for maintenance.

APPROPRIATIONS.

For present project:

June 25, 1910.....	\$200, 000. 00
July 25, 1912.....	62, 000. 00
Mar. 4, 1913.....	25, 000. 00
Mar. 4, 1913 (allotted July 27 and Sept. 14, 1914).....	8, 000. 00

For present project—Continued.

Oct. 2, 1914 (allotted Oct. 7, 1914) -----	\$20,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915, and Mar. 11, 1916) -----	40,000.00
July 27, 1916 -----	30,000.00
Total -----	888,000.00
Sale of contact prints -----	8.65
Grand total -----	888,008.65

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Class.	Ameri- can.	Net registered tonnage.	Passen- gers.
Registered, all classes.....	993	19,226	590

From records compiled by the bridge tenders, these vessels carried a total of 9,064 tons of general cargo, valued at \$1,054,150. One self-propelled barge made weekly trips between Galveston and Corpus Christi through the inland waterway until the latter part of the year when it was destroyed by fire.

(C) CHANNEL FROM ARANSAS PASS TO PASS CAVALLO.

Under an emergency contract entered into with John Jacobson, of Texas City, Tex., on May 14, 1915, two parallel dikes built of creosoted piles and sheet piles, 1,536 and 1,860 feet long, respectively, were constructed from the Port O'Connor Cut eastward into Matagorda Bay. This work was begun July 6 and completed September 30, 1915, some delay being caused by the hurricane of August 16-17, 1915. The contract was for 1,396 linear feet of 2 by 12 inch sheet-pile dike, at \$2.31 per linear foot, \$3,224.76; 1,332 linear feet of 4 by 12 inch sheet-pile dike, at \$5.555 per linear foot, \$6,843.77; 784 linear feet of round-pile dike, at \$13.205 per linear foot, \$10,352.72; and 202.51 tons of riprap, at \$2.50 per ton, \$506.38. As additional riprap was considered necessary to strengthen the dike at its outer ends, a further contract was entered into with John Jacobson, of Texas City, Tex., under date of August 7, 1915, for 1,000 tons of riprap. Under this contract a total of 1,096.35 tons of riprap were placed alongside the dikes at their outer ends, at \$3.15 per ton, a total of \$3,453.50. The U. S. pipe-line dredge *Guadalupe* worked from December 15, 1915, to March 6, 1916, and dredged Port O'Connor Cut between the bulkheads, the channels at east and west ends of Bar Room Bay, and made a new cut between the first chain of islands between Espiritu Santo and San Antonio Bays to provide a more direct route for the inland waterway, removing a total of 108,490 cubic yards of material at a total cost of \$8,307.12, all for maintenance. The total expenditures on this section was \$38,273.07, all for maintenance, including superintendence, inspection, office expenses, and alterations to dredge *Guadalupe*. The ruling depth on June 30, 1916, was 4 feet.

APPROPRIATIONS.

For present project:

Mar. 2, 1907	\$25,500.00
May 27, 1908	40,850.00
Mar. 8, 1909 (allotted Mar. 27, 1909)	40,000.00
Mar. 4, 1913 (allotted Jan. 19 and May 25, 1914)	6,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	25,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915, and Mar. 11, 1916)	45,000.00
July 27, 1916	80,000.00
Total	211,850.00
Sale of contact prints	4.20
Grand total	211,854.20

CONTRACTS IN FORCE.

DIKE WORK.

Contractor: John Jacobson, Texas City, Tex.

Amount and character of work: (1) 1,600 linear feet 2 by 12 inch sheet pile dike; (2) 1,200 linear feet 4 by 12 inch sheet pile dike; (3) 800 linear feet round pile dike; (4) 200 tons of riprap.

Rate: (1) \$2.31 per linear foot completed dike; (2) \$5.555 per linear foot completed dike; (3) \$13.205 per linear foot completed dike; (4) \$2.50 per ton of 2,000 pounds in place.

Date of contract: May 14, 1915.

Date of approval: Emergency contract.

Date of beginning work: June 19, 1915.

Date of expiration: August 20, 1915.

Date completed: September 30, 1915.

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Numerous gasoline and sailing boats use this section of the inland waterway. One self-propelled barge used this section 45 times, with a total net tonnage of 9,630.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Coal.....	20	\$160	Fish.....	420	\$63,000
Cotton.....	1,743	48,320	Oysters.....	220	6,600
General merchandise.....	581	58,100			
Sugar.....	37	4,736	Total.....	8,032	181,356
Rice.....	11	440			

The above statistics were furnished by fish and oyster companies engaged in that business along this section of the inland waterway. The figures regarding the rest of the traffic were furnished by the Galveston Wharf Co., which kept a record of the tonnage carried by the barge *Pioneer*.

(D) GUADALUPE RIVER TO VICTORIA.

The work of converting the U. S. snag boat *Guadalupe* into a combined suction dredge and snag boat was completed and the dredge began work on this section March 9, 1916, and redredged

the channel through San Antonio Bay to the mouth of the river, a distance of 37,495 feet, excavating a total of 369,601 cubic yards of material, restoring the channel to a depth of 5 feet and width of 40 feet, at a total cost of \$15,758.05. Work of rebuilding the U. S. derrick barge *No. 2* was completed and all machinery installed, the boat being placed in commission on March 24, 1916, and worked to June 17, 1916, when it was laid up, clearing the river to the mouth, removing a total of 342 large snags and 102 small snags, at a cost of \$2,752.90. The total expended on this section during the fiscal year was \$18,141.91, all for maintenance.

APPROPRIATIONS.

For present project:

Mar. 2, 1907	\$38,829.00
May 27, 1908	21,871.00
Mar. 3, 1909 (allotted Mar. 27, 1909)	50,000.00
Mar. 4, 1909	32,000.00
June 25, 1910	50,000.00
July 25, 1912	40,000.00
Mar. 4, 1913	15,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	15,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)	15,000.00
July 27, 1916	23,500.00
Total	301,200.00
Sales of contact prints	4.95
Sales of condemned property	95.00
Grand total	301,299.95

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

No vessel classification obtainable.

Sixty-three thousand one hundred and ten tons of gravel and sharp sand were carried over the upper section of the river. This tonnage had a valuation of \$35,040. These figures were submitted by the Guadalupe River Navigation Co. Statistics regarding the traffic on the lower section of the river were unobtainable.

8. MAINTENANCE AND CARE OF BOOMS AND BRIDGES, INLAND WATERWAY ON COAST OF TEXAS.

A boom tender was stationed at entrances of the canal into the Brazos River to care for booms constructed at that point and bridge tenders for operating and care of drawbridges across waterway between Brazos River and Matagorda Bay. The bridges were damaged by the hurricane of August 16-17, 1915, and were repaired by the U. S. snag boat *Waco* at a cost of \$1,764.68. The total cost of operating and care for these booms and bridges amounted to \$3,808, all for maintenance.

EXPENDITURES.

Fiscal year ending June 30—		Fiscal year ending June 30—	
1905	\$334.23	1912	\$110.00
1906	1,002.36	1913	120.00
1907	599.53	1914	1,832.27
1908	1,981.55	1915	3,889.28
1909	120.00	1916	3,808.00
1910	130.00		
1911	120.00	Total	14,047.22

COMMERCIAL STATISTICS.

Galveston & Brazos Canal.—Number of vessels passing through drawbridge at the causeway, 4,643, with an estimated tonnage of 27,858. No record is made of freight carried by these vessels, but nearly all the freight tonnage shown under "Waterway between Brazos River and Matagorda Bay" (below) is carried through this section of the inland waterway.

Waterway between Brazos River and Matagorda Bay.—Record of vessels passing through this section of the inland waterway as compiled by bridge tenders: 993 vessels, 19,226 registered tonnage, 9,064 tons freight, \$1,054,150 freight value, 590 passengers.

9. MOUTH OF BRAZOS RIVER.

The new U. S. seagoing hopper dredge *Comstock* worked from February 26 to 28 and from April 17 to 28 and from May 11 to 22 and June 6 to 30, 1916, in partially restoring this channel to a depth of 18 feet and width of 100 to 200 feet across the bar near the outer end of the jetties, removing a total of 130,050 cubic yards of material at a total cost of \$42,015.99, including \$21,816.18 expended on construction of dredge *Comstock*. On June 30, 1916, there existed a navigable channel 18 feet deep and 150 feet wide extending across the bar to the channel between the jetties up to the docks of the Seaboard & Gulf Steamship Co., a distance of about $1\frac{1}{2}$ miles.

APPROPRIATIONS.

For previous projects (acts of June 14, 1880, to June 3, 1896, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 412) ----- \$168,750.00
For present project:

Mar. 3, 1899	-----	\$85,000.00	
June 13, 1902	-----	50,000.00	
Mar. 3, 1905	-----	50,000.00	
June 30, 1906	-----	87,500.00	
Mar. 2, 1907	-----	35,000.00	
Feb. 27, 1911	-----	100,000.00	
July 25, 1912	-----	25,000.00	
Mar. 4, 1913	-----	125,000.00	
Mar. 4, 1913 (allotted Nov. 11, 1913)	-----	10,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	-----	20,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	-----	30,000.00	
July 27, 1916	-----	175,000.00	
			792,500.00
Total	-----		956,250.00
Sales of condemned property	-----		8.82
Sales of contact prints	-----		5.40
Grand total	-----		956,264.22

CONTRACT IN FORCE.

Contractor: Ellicott Machine Corporation, Baltimore, Md.
Amount and character of work: One seagoing hopper dredge.
Rate: \$198,800.
Date of contract: February 4, 1914.
Date of approval: February 21, 1914.
Date fixed for commencement: March 9, 1914.
Date fixed for completion: December 27, 1914.
Date completed: August 17, 1915.

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Class.	Number.	Net registered tonnage.
Registered:		
Steam.....	42	91,800
Sailing.....	2	1,327
Tugs.....	30	.....
Barges.....	30	27,000
Total.....	104	120,127

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Ammunition.....	1,080	\$1,296,000	Iron pipe.....	881	\$49,236
Bagging.....	69	7,590	Machinery, boilers, etc.....	439	109,750
Binders twine.....	15	2,700	Miscellaneous articles.....	491	49,100
Books.....	219	109,800	Paints and oils.....	145	17,400
Dry goods.....	1,758	1,758,000	Paper, printing.....	2,983	164,065
Drugs.....	168	168,000	Soap and soap powders, etc.....	1,919	120,492
Canned goods.....	1,444	173,280	Sulphur.....	58,208	1,164,180
Fireworks.....	41	28,700	Wire, etc.....	74	2,960
Fuel oil.....	78,955	461,913			
Hardware.....	446	58,520	Total.....	149,335	5,745,498

The above statistics were furnished by the Seaboard & Gulf Steamship Co., and the Freeport Commerce League.

The Freeport Sulphur Co. advise that 90,000 tons of sulphur, valued at \$1,800,000, has been diverted from steamer shipment to all-rail shipment owing to inadequate depth for steamers suited for this traffic.

10. BRAZOS RIVER, TEX., FROM VELASCO TO OLD WASHINGTON

The U. S. snag boat *Waco* continued work during the year between Velasco and mile 125, above the mouth, removing a total of 17,342 snags, overhanging trees, and other obstructions, at a total cost of \$18,191.80.

APPROPRIATIONS.

For previous projects (acts June 3, 1896, to June 13, 1902, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 413)..... \$155,000.00

For present project:

Mar. 3, 1905.....	\$25,000.00
Mar. 2, 1907.....	75,000.00
Mar. 3, 1909 (allotted Apr. 2, 1909).....	25,000.00
Mar. 3, 1909 (allotted to Galveston district Apr. 9, 1909, transferred to Dallas district Apr. 18, 1909, on account of snag boat <i>Capt. C. W. Howell</i>).....	15,000.00
June 25, 1910.....	45,000.00
Feb. 27, 1911.....	25,000.00
July 25, 1912.....	15,000.00
Mar. 4, 1913.....	25,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	10,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	10,000.00
July 27, 1916.....	15,000.00
	285,000.00

Total.....	440,000.00
Received on account of sales.....	528.96
Received from Galveston office (Velasco to Richmond).....	11.79

Grand total..... 440,538.75

COMMERCIAL STATISTICS.

No commercial statistics obtainable.

11. BRAZOS RIVER, FROM OLD WASHINGTON TO WACO.

LOCK AND DAM AT HIDALGO FALLS.

LOCK NO. 1.

Lock and dam No. 1, at Hidalgo Falls, was completed during the fiscal year 1915, and is now reported under the caption of "Operating and care of canals and other works of navigation, indefinite." A small balance of \$212.85 was spent for miscellaneous repairs.

LOCK NO. 2.

Operations have not been started at this lock, as the sites for it have not yet been procured by local interests and turned over to the United States. Maneuver boat was rigged with a stiff-leg A-frame derrick and three-drum hoisting engine and slewing gear and fitted with a cabin. Total expenditures during the year were \$10,018.61.

LOCK NO. 6.

No work has been started on this lock on account of delay on the part of local interests in securing the sites and turning them over to the United States. Maneuver boat for this lock has been maintained and rigged with stiff-leg A-frame derrick and three-drum hoisting engine and slewing gear, etc., and fitted with cabin. Additional lumber and material have been assembled for constructing eight small barges for locks 3 and 6. Total expenditures were \$8,078.69.

LOCK NO. 8.

Work was done with Government plant and hired labor, a total of 590 cars handled over the lock railroad spur, and the lock, pass, pier, cofferdams, weir, etc., all completed, repaired washout in abutment and placed riprap protection. The raising of the dam developed several small leaks in its sheet piling, necessitating remedial measures, preparations for which were in progress at the close of the fiscal year. Total cost of work during year was \$97,944.20, all for original work.

APPROPRIATIONS.

For present project:

Mar. 3, 1905	-----	\$75,000.00
Mar. 2, 1907	-----	75,000.00
May 27, 1908	-----	100,000.00
Mar. 3, 1909 (allotted Apr. 10, 1909)	-----	75,000.00
Mar. 4, 1909	-----	50,000.00
June 25, 1910	-----	75,000.00
Feb. 27, 1911	-----	50,000.00
July 25, 1912	-----	200,000.00

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For present project—Continued.

Mar. 4, 1913	\$250,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	200,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)	200,000.00
July 27, 1916	200,000.00
Total	1,550,000.00
Receipts from sales, etc.	654.74
Grand total	1,550,654.74

CONTRACTS IN FORCE.

Contractor: Texas Sand & Gravel Co., Waco, Tex.
 Character of work: Furnishing gravel, 8,750 tons.
 Rate: \$1.36 per cubic yard.
 Date of approval: October 18, 1913.
 Date of beginning work: Fifteen days from date of notice to commence delivery.
 Date of expiration: Twelve months from date of commencing delivery.
 Contract completed: July 20, 1915.

Contractor: Southwestern States Portland Cement Co., Dallas, Tex.
 Character of work: Furnishing cement, 8,000 barrels.
 Rate: \$2.28 per barrel.
 Date of approval: October 15, 1913.
 Date of beginning work: Thirty days after date of notification to commence delivery.
 Date of expiration: Twelve months from date of commencing delivery.
 Contract completed: September 30, 1915.

COMMERCIAL STATISTICS.

No freight is now carried on this section of the river. There can be no commercial effect of the improvement until it is completed.

12. OPERATING AND CARE OF LOCK AND DAM NO. 1, BRAZOS RIVER.

The work at this lock consisted in repairing damage caused by high water to the upper guide crib and in placing riprap below the dam. During the month of September, 1915, the entire dam was raised and pool filled to its full head, being kept up for four days as a test. A leak developed in the river wall of the lock near the floor, and allotment has been asked for to repair this damage. Other work consisted in minor work to lock tender's dwelling, care and upkeep of the fence and grounds, etc. The total cost of the work was \$13,199.85, all for maintenance.

EXPENDITURES.

Fiscal year ending June 30—

1915	\$2,346.60
1916	13,199.85
Total	15,546.45

13. CHANNEL FROM PASS CAVALLO TO PORT LAVACA, TEX.

No work has been performed on this channel during the year. The expenditure of \$1,954.32 was for repairs and alterations to the U. S. dredge *Guadalupe* in converting to a combined suction dredge and snag boat.

APPROPRIATIONS.

For present project:	
June 25, 1910-----	\$10,000.00
Mar. 4, 1913-----	5,000.00
Total -----	15,000.00

COMMERCIAL STATISTICS.

Owing to lack of cooperation on the part of the local interests no commercial statistics could be obtained. There is a large amount of fish and oysters carried over this waterway.

14. PORT ARANSAS, TEX.

Jetties.—Work on repairs to the north jetty was commenced on July 28, 1915, under contract with Charles Clarke & Co., of Galveston, dated May 20, 1915, and repairs were made between station 84 plus 50 and station 92 plus 41, a distance of 791 feet, near the outer end of the jetty, completing the station 90 plus 80, or 86 per cent of the contract, and placing the following material:

11,715.10 tons small riprap, at \$2.98 per ton-----	\$34,911.00
7,791.90 tons large riprap, at \$2.98 per ton-----	23,219.86
15,726.90 tons large riprap, 3 to 7 tons, at \$2.98 per ton-----	46,866.16
3,456.10 crest blocks, at \$3.98 per ton-----	13,755.28
38,690.00	118,752.30

Repairs were begun to south jetty on June 21, 1916, and 31.15 tons of small riprap placed, at cost of \$4 per ton, \$124.60; 312.10 tons of slope rock placed, at rate of \$4.50 per ton, \$1,404.45; and 11 large blocks rebedded, at cost of \$82.50; a total of \$1,611.55.

Dike on St. Joseph Island.—The dike on St. Joseph Island was extended from 10,000 feet to 20,991 feet, placing a total of 43,478.7 tons of small riprap, at \$3.20 per ton, \$139,131.84, and 3,450 tons of small quarry refuse, at \$3.20 per ton, \$11,040. This extension was completed on March 31 1916; 8,000 salt-cedar cuttings were planted along the toe of the dike on St. Joseph Island to encourage the collection of sand. The total cost of this extension was \$154,938.58, all for new work.

Dredging.—Dredging between the jetties was carried on at different times during the year with the U. S. seagoing hopper dredges *Galveston* and *Comstock*. A total of 552,710 cubic yards were removed from near the outer end of the jetties at a total cost of \$54,691.43. The U. S. seagoing hopper dredge *Charleston*, borrowed from the Mobile, Ala., district, which had worked on this improvement during the fiscal year 1915, was repaired at a cost of \$4,494.52, which was charged to this improvement, and the sum of \$7,230.08 for repairs and alterations of the U. S. snag boat *Guadalupe* to a com-

bined suction dredge and snag boat was also charged to this improvement. The new seagoing hopper dredge *Comstock* was completed August 17, 1915, at a total cost of \$213,211.30, the sum of \$113,458.91 being charged to this improvement and \$99,756.39 to mouth of Brazos River, Tex.

Deep-water harbor.—Work under contract with Mr. P. B. Miller, of Houston, Tex., approved March 31, 1915, was continued and completed July 16, 1915, and a section of the harbor adjacent to the docks at the lower end of the harbor was redredged to a depth of 25 feet, removing a total of 41,784 cubic yards of material at the rate of 12.48 cents per cubic yard, \$5,214.64; and 22,172 from the next foot below prescribed, at a rate of 6.24 cents per cubic yard, \$1,388.41, all for maintenance.

A fuel-oil supply station, consisting of 2,500-barrel steel tank with 8-horsepower gasoline engine, rotary pump, etc., connected with the United States wharf, was installed at a cost of \$3,134.77 and a contract let for constructing new wharf at a cost of \$5,890. The total cost of all work on this improvement during the fiscal year was \$383,796.42, of which \$221,354.56 was for new work and \$165,441.86 for maintenance.

APPROPRIATIONS.

ARANSAS PASS.

For previous projects (acts of Mar. 3, 1879, to Feb. 27, 1911, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 399)-----	\$2, 278, 750.00
Sales of contact prints-----	40.16
Sales of condemned property-----	61.00
Total -----	2, 278, 851.16

HARBOR ISLAND HARBOR.

For previous projects (acts Feb. 27, 1911, to Aug. 24, 1912, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 399)-----	375, 000.00
Sales of contact prints-----	.30
Total for previous projects -----	2, 653, 851.46

PORT ARANSAS.

For present project:	
Mar. 4, 1913-----	\$600, 000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	470, 000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)-----	180, 000.00
July 27, 1916-----	100, 000.00
	1, 350, 000.00
Sales of contact prints-----	4, 008, 851.46
Sale of coal to Quartermaster Department-----	4.00
	187.20
Grand total of appropriations -----	4, 008, 750.00
Grand total of receipts from all sources -----	4, 004, 043.26

CONTRACTS IN FORCE.

DREDGING.

Contractor: P. B. Miller, Houston, Tex.

Amount and character of work: 408,000 cubic yards place measurement.

Rate: 12.48 cents per cubic yard from prescribed cross section; one-half price for next foot below.

Date of contract: March 31, 1915.
 Date of approval: April 14, 1915.
 Date fixed for commencement: May 21, 1915.
 Date of expiration: October 21, 1915.
 Date completed: July 18, 1915.

JETTY AND DIKE WORK.

Contractor: Charles Clarke & Co., Galveston, Tex.

Amount and character of work: Jetty work (a) 10,700 tons small riprap, 15 to 200 pounds for core; (b) 8,600 tons large riprap, 200 pounds to 8 tons for core; (c) 20,600 tons large riprap, 8 to 7 tons for slopes; (d) 5,500 tons crest stone. Dike work (e) 87,200 tons riprap, 15 to 200 pounds in mound; (f) 11,800 tons quarry refuse in trenches.

Rate per ton of 2,000 pounds in place: (a) \$2.98; (b) \$2.98; (c) \$2.98; (d) \$8.98; (e) \$8.20; (f) \$8.20.

Date of contract: May 20, 1915.

Date of approval: June 8, 1915.

Date fixed for commencement, August 11, 1915.

Date of expiration: Jetty work, September 12, 1916; dike work, April 12, 1916.

Completed at end of June, 1916: Dike work, 100 per cent; jetty work, 86 per cent.

JETTY WORK.

Contractor: Charles Clarke & Co., Galveston, Tex.

Amount and character of work: (a) 1,000 tons small riprap from 15 to 200 pounds per piece, properly placed in the core of the work; (b) 2,600 tons large riprap from 5 to 10 tons per piece, properly placed in the slopes of the work; (c) 600 tons crest stone not less than 10 tons each, properly placed in the work; (d) 70 crest block and slope stone picked up and rebeked.

Rate: (a) \$4 per ton of 2,000 pounds; (b) \$4.50 per ton of 2,000 pounds; (c) \$6 per ton of 2,000 pounds; (d) \$7.50 per piece.

Date of contract: May 20, 1916.

Date of approval: Emergency contract.

Date of beginning work: June 28, 1916.

Date of expiration: August 28, 1916.

Completed at end of June, 1916: 8 per cent.

WHARF CONSTRUCTION.

Contractor: Charles Clarke & Co., Galveston, Tex.

Amount and character of work: Constructing wharf.

Rate: \$5,980.

Date of contract: April 15, 1916.

Date of approval: April 24, 1916.

Date of beginning work: May 9, 1916.

Date of expiration: June 28, 1916.

Completed at end of June, 1916: None.

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers.....	20	6	26	56,852
Tugs.....		2	2	110
Barges.....		1	1	1,372
Total.....	20	9	29	58,334

Freight traffic.

Articles.	Short tons.	Value.
Cotton.....	9,453	\$2,268,720
Forest products.....	600	12,000
Fuel oil.....	110,336	772,352
Total.....	120,389	3,053,072

The above statistics were furnished by the deputy collector of customs and the Aransas Pass Channel & Dock Co.

In addition to the above most of the tonnage shown under "Channel from Aransas Pass to Corpus Christi" moved over this waterway.

15. CHANNEL FROM ARANSAS PASS TO CORPUS CRISTI, TEX.

Work under the contract with Mr. P. B. Miller, of Houston, Tex., approved March 31, 1915, was commenced July 17, 1915, and completed on July 23, 1915, dredging over a shoal for a distance of 2,700 feet in restoring the channel to a depth of 12 feet and a width of 100 feet, removing a total of 34,645 cubic yards of material at a rate of 23.24 cents per cubic yard, \$8,051.50, and 10,928 cubic yards from the next foot below prescribed, at a rate of 11.62 cents per cubic yard, \$1,269.83. The ruling depth, on June 30, 1916, was 9.5 feet in channel and 10 feet in turning basin at mean low tide. The cost of the work was \$9,505.20, all for maintenance.

APPROPRIATIONS.

Turtle Cove Channel from Turtle Cove to Corpus Christi, Tex.

For previous projects (acts Mar. 2, 1907, to Mar. 4, 1909, inclusive, see H. Doc. No. 1491, 63d Cong., 3d sess., p. 399)..... \$128,710.17
Sales of contract prints..... 13.40

Total for previous projects..... 128,723.57

Channel from Aransas Pass to Corpus Christi, Tex.

For present project:
June 25, 1910..... \$157,900.00
Mar. 4, 1913..... 10,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)..... 10,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)..... 15,000.00
July 27, 1916..... 15,000.00
207,900.00
334,623.57
Sales of contract prints..... 3.00

Grand total of appropriations..... 334,610.17

Grand total of receipts from all sources..... 334,623.57

CONTRACT IN FORCE.

DREDGING.

Contractor: P. B. Miller, Houston, Tex.

Amount and character of work: Dredging 100,000 cubic yards place measurement.

Rate: 23.24 cents per cubic yard from prescribed cross section. One-half price for next foot below.

Date of contract: March 31, 1915.

Date of approval: April 14, 1915.

Date fixed for commencement: May 21, 1915.

Date of expiration: October 21, 1915.

Date completed: July 23, 1915.

COMMERCIAL STATISTICS.

Season of navigation: Navigable the entire year.

Vessel classification.

Class.	Number.	Net registered tonnage.	Passengers.
Steamers.....	52	7,852	.....
Launches.....	208	2,704	8,500
Total.....	260	10,556	8,500

In addition to the above numerous small launches make use of the channel in going to and from the fishing grounds.

Freight traffic.

Articles.	Short tons.	Value.	Articles.	Short tons.	Value.
Ammunition.....	41	\$47,285	Merchandise, miscellaneous...	193	\$19,306
Beans.....	22	1,116	Molasses.....	66	8,539
Buckets, galvanized.....	1	341	Milk, canned.....	17	4,239
Bagging, cotton.....	15	1,789	Nails.....	178	7,120
Canned goods.....	466	56,341	Paint.....	10	1,273
Cigars.....	7	19,584	Powder, baking.....	5	2,958
Chocolate.....	11	4,009	Potatoes.....	127	5,080
Coconut.....	2	1,721	Pipe.....	1,236	69,216
Candy.....	5	4,409	Paper.....	80	4,400
Coffee.....	26	15,370	Rope.....	11	1,980
Cotton.....	7,156	1,717,440	Rice.....	77	6,180
Dry goods.....	46	45,700	Sugar.....	609	77,952
Enamel ware.....	2	1,203	Staples.....	35	5,612
Earthenware.....	4	349	Starch.....	6	590
Fish, fresh.....	50	10,000	Soda, lye, etc.....	3	330
Fruits, dried.....	13	2,520	Sardines.....	67	20,100
Gasoline, etc.....	200	6,000	Shoes.....	14	19,244
Groceries.....	644	140,583	Vinegar.....	7	280
Grain and feed.....	150	4,300	Wire.....	199	8,080
Hardware.....	163	19,556	Oil, crude.....	14,744	93,372
Lamp chimneys.....	1	390			
Lard.....	88	21,858	Total.....	26,803	2,479,358
Linoleum.....	6	1,200			

The above statistics were furnished by the mayor of Corpus Christi and local firms connected with the traffic.

IMPROVEMENT OF RIVERS AND HARBORS IN THE DALLAS, TEX., DISTRICT.

REPORT OF MAJ. W. J. BARDEN, CORPS OF ENGINEERS.

IMPROVEMENTS.

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1. Johnsons Bayou, La.....	2509	7. Cypress Bayou and waterway between Jefferson, Tex., and Shreveport, La.....	2532
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3. Sabine-Neches Canal, including Sabine River to Orange, and Neches River to Beaumont, Tex.....	2512	9. Red River from Fulton, Ark., to mouth of Washita River, Okla.....	2534
4. Harbor at Sabine Pass and Port Arthur Canal, Tex.....	2516	10. Sulphur River, Tex. and Ark.	2536
5. Trinity River, Tex.....	2521		
6. Operating and care of locks and dams, Trinity River, Tex....	2531		

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 982 TO 1015.

1. JOHNSONS BAYOU, LA.

The channel was redredged in September, 1915, by the U. S. hydraulic pipe-line dredge *Orange* to a depth of 7½ feet and width of 100 feet, the material being pumped on the south side about 400 feet from the channel. The length of the cut was 1,800 feet. Twenty-nine thousand nine hundred and fifty-six cubic yards of silt and sand were removed, at a total cost of \$1,546.95, or 5.16 cents per cubic yard.

APPROPRIATIONS.

Mar. 3, 1899.....	\$2,500.00
Mar. 2, 1907.....	2,500.00
Mar. 3, 1905 (allotted Mar. 13, 1911, from emergency appropriation).....	1,795.69
July 25, 1912.....	2,500.00
Mar. 4, 1913.....	2,500.00
July 27, 1916.....	2,500.00
Total appropriated and allotted.....	14,295.69
Reverted to surplus fund of Treasury from appropriation of Mar. 3, 1899.....	238.65
Net total.....	14,057.04

¹ Allotment of \$2,000, of which \$204.81 was returned to the Treasury to credit of appropriation.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered, gasoline.....	8	52
Unregistered, barges.....	4	300
Total.....	12	352

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Cattle.....	550 head.....	165	\$11,000
Chickens.....	120 dozen.....	1.8	720
Cotton, baled.....	75 bales.....	19	3,525
Cotton seed.....	58,000 pounds.....	29	725
Cottonseed meal.....	40,000 pounds.....	20	700
Cordwood.....	300 cords.....	300	1,200
Corn.....	15,200 bushels.....	456	1,340
Eggs.....	2,800 dozen.....	2	560
Feed.....	134,000 pounds.....	67	1,340
Furs.....	15,000 pelts.....	2	3,000
Hides.....	1,528.....	15	6,112
Lumber.....	250,000 feet b. m.....	437	6,250
Machinery.....	180,000 pounds.....	90	18,000
Meats, dressed.....	250,000 pounds.....	125	25,000
Merchandise.....	755,000 pounds.....	378	28,000
Melons.....	24,000.....	120	2,400
Potatoes, Irish.....	300 bushels.....	9	300
Potatoes, sweet.....	1,200 bushels.....	34	1,020
Total.....		2,269.8	111,192

2. MOUTHS OF SABINE AND NECHES RIVERS, TEX.

The operations during the fiscal year were for maintenance, work being carried on by Government plant and by day labor. The floating plant, office, boathouse, warehouse, wharf, and marine ways at the Port Arthur field office were properly cared for, and minor improvements made. The U. S. hydraulic pipe-line dredge *Orange* worked at the guard lock (see Sabine-Neches Canal, including Sabine River to Orange and Neches River to Beaumont, Tex.) in November, December, and part of January, in restoring the original channel and filling the by-pass which had been dug to permit the construction of the guard lock. Approximately 128,000 cubic yards were dredged at a cost of \$10,448.17, or 8.16 cents per cubic yard. The total expenditure for the year was \$12,364.38. There was received from the Bowers Southern Dredging Co. the sum of \$10 as reimbursement for cost of moving and caring for an engine and boiler belonging to that company. This transaction is not shown in the money statements.

APPROPRIATIONS.

Mar. 3, 1899.....	\$10,000.00
June 13, 1902.....	125,000.00
June 30, 1906.....	411,500.00
Total appropriated.....	546,500.00
Receipts from sales.....	825.70
Grand total.....	546,825.70

COMMERCIAL STATISTICS.

[Calendar year 1915.]

SABINE RIVER.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	4	106
Sailing vessels.....	1	77
Gasoline.....	15	104
Barges.....	10	3,371
Unregistered barges.....	38	5,544
Total.....	68	9,202

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Cattle.....	150 head.....	45	\$3,000
Cordwood.....	100 cords.....	100	400
Cotton, baled.....	75 bales.....	19	3,525
Cotton seed.....	58,000 pounds.....	29	725
Cottonseed meal.....	40,000 pounds.....	20	700
Feed.....	49,700 bushels.....	925	26,820
Hides.....	1,000.....	10	4,000
Logs.....	234,158.....	200,495	835,395
Lumber.....	37,979,631 feet b. m.....	66,464	948,500
Machinery.....	130,000 pounds.....	65	13,000
Meat, dressed.....	125,000 pounds.....	63	12,500
Merchandise.....	475,000 pounds.....	237	17,775
Oils, crude.....	1,670,213 barrels.....	263,058	1,920,745
Rice.....	19,218 sacks.....	1,730	76,672
Shell, clam.....	8,000 cubic yards.....	8,000	10,000
Total.....		541,280	3,875,957

NECHES RIVER.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	7	337
Gasoline.....	7	52
Barges.....	10	4,686
Unregistered barges.....	11	1,350
Total.....	35	6,425

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt.....	110,454 barrels.....	19,330	\$396,589
Groceries.....	294,000 pounds.....	147	11,025
Logs.....	28,380.....	70,950	71,450
Lumber.....	6,079,283 feet b. m.....	10,638	151,975
Machinery.....	90,000 pounds.....	45	9,000
Miscellaneous.....	100,000 pounds.....	50	1,500
Oil, crude.....	829,589 barrels.....	130,660	954,028
Oils, lubricating.....	26,224 barrels.....	147	206,792
Rice.....	1,795 sacks.....	161	7,180
Sand.....	51,085 cubic yards.....	63,856	40,868
Total.....		295,964	1,843,407

SABINE-NECHES CANAL.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers.....	8	267
Sailing vessels.....	1	77
Gasoline.....	15	114
Barges.....	21	6,437
Unregistered barges.....	44	7,049
Total.....	89	14,044

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt.....	110,450 barrels.....	19,330	\$396,589
Cattle.....	100 head.....	30	2,000
Feed.....	974,000 pounds.....	487	9,740
Hides.....	275.....	3	1,100
Ice.....	2,608,000 pounds.....	1,304	13,040
Iron and steel.....	41 tons.....	41	1,640
Lumber.....	43,808,914 feet b. m.....	76,665	1,065,223
Machinery.....	69 tons.....	69	13,800
Meat, dressed.....	47 tons.....	47	9,500
Merchandise.....	1,032 tons.....	1,032	77,400
Miscellaneous.....	50 tons.....	50	1,500
Oil, crude.....	2,499,802 barrels.....	393,719	2,874,772
Oils, lubricating.....	26,224 barrels.....	4,327	206,792
Rice.....	2,195 sacks.....	197	8,780
Sand.....	7,605 cubic yards.....	9,506	6,064
Shells, clam.....	8,000 cubic yards.....	8,000	10,000
Water.....	6,831,300 gallons.....	28,350	2,732
Total.....		543,157	4,723,692

3. SABINE-NECHES CANAL, INCLUDING SABINE RIVER TO ORANGE, AND NECHES RIVER TO BEAUMONT, TEX.

SECTION "B."

The contractor for section "b" worked on his supplemental agreement for widening the canal in the lake section, from the beginning of the year until August 16, 1915, when a tropical hurricane so

damaged his plant that he asked to have the work finished by the United States. This request was approved, and the work was finished by the U. S. hydraulic pipe-line dredge *Orange* in September, 1915. The contractor removed 195,716 cubic yards over a distance of 5,750 feet opposite Old River Cove. The *Orange* removed 18,950 cubic yards over a distance of 750 feet, at a total cost of \$1,503.09, or 7.93 cents per cubic yard.

Shoaling having occurred in the Orange turning basin, the Sabine River at miles 12-13 above the mouth and in a portion of the lake section of the canal, prior to the completion of the guard lock, redredging by the *Orange* was authorized in order that the channel might be turned over with full dimensions to the Orange County navigation district for three years' maintenance, as required by the terms of the act adopting the project. This work was begun April 5 and completed May 6, 28,150 cubic yards being removed from the turning basin, 5,550 cubic yards from the river over a distance of 650 feet, and 42,832 cubic yards from the lake section over a distance of 4,600 feet, a total of 76,532 cubic yards. The cost was \$5,111.72, or 6.7 cents per cubic yard.

This section was formally transferred to the Orange County navigation district on May 25, 1916, for maintenance without cost to the United States for three years from the date of completion (May 6, 1916), in accordance with the terms of the act adopting this project.

SECTIONS "A" AND "C."

At the guard lock work was continued by day labor (except for the placing of lock gates, which work was done by contract), and by November 15, 1915, was substantially completed, the principal items of work being as follows:

One-man stone concrete.....	cubic yards..	172
Concrete.....	do.....	2,536
Excavation	do.....	2,825

The removal of the cofferdam, dredging through the lock, and filling of the by-pass were completed, and the channel opened to deep-draft vessels in January, 1916. Fifty dolphins of five piles each, wooden fender protection of masonry and gates, and 12 mooring posts for boats awaiting entrance to the lock were later placed. The total amount expended on the guard lock during the fiscal year was \$47,203.70.

To remove shoaling that had occurred in section "C" (the Neches River and Beaumont turning basin), the U. S. dredge *Orange* dredged 99,106 cubic yards from January 24 to March 30. Of this amount 36,288 cubic yards were from the turning basin and cut-off at Beaumont, 45,778 cubic yards from the Neches River below Beaumont over a distance of 5,000 feet, 6,000 cubic yards over a distance of 375 feet just above Snaggy Bend, and 11,040 cubic yards over a distance of 750 feet at mile 16 above the mouth. In May this dredge widened the channel just above the natural cut-off about 7 miles below Beaumont, removing 58,500 cubic yards over a distance of 2,650 feet, and also removed 2,828 cubic yards from a shoal just below Snaggy Bend. The total cost of this dredging was

\$14,008.48, of which \$12,441.94 was paid from allotments for the guard lock and \$765.67 from the \$1,000 contributed by the Beaumont navigation district of Jefferson County. The unit cost was approximately 8.7 cents per cubic yard.

The guard lock and section "C" were formally transferred to the Beaumont navigation district of Jefferson County, Tex., on June 1, 1916, for maintenance without cost to the United States, the former until otherwise provided by law and the latter for three years from the date of completion (May 24, 1916), in accordance with the terms of the acts adopting and amending this project.

There was collected from the Lutchter & Moore Lumber Co. the sum of \$174 to cover the estimated cost of replacing a fender pile cluster at the guard lock which had been damaged by a boat belonging to that company. Of this amount \$120.49 was expended for replacing the pile cluster and the balance returned to the company. This transaction does not appear in the money statements.

MAINTENANCE OF SECTION "A."

The maintenance of section "a," except the guard lock, having devolved on the United States by the amendment of the project carried in the river and harbor act of March 4, 1915, an allotment of \$5,000 was made for the removal of shoaling that had occurred between the Neches River and the guard lock. In October, 1915, the U. S. dredge *Orange* removed 136,756 cubic yards over a distance of 3,800 feet south of the Neches River, at a total cost of \$4,430.56, or approximately 3.2 cents per cubic yard.

The total amount expended on this project during the fiscal year was \$110,387.99, made up of \$61,212.18 for sections "a" and "c," \$44,745.25 for section "b," and \$4,430.56 for maintenance of section "a." From the total expenditures on this project, as shown in preceding reports, the sum of \$8,576.95 should be deducted, this amount being a reimbursement to this work from the appropriation for "Improving mouths of Sabine and Neches Rivers, Tex."

APPROPRIATIONS.

Sections "a" and "c":		
Feb. 27, 1911	-----	\$150,000.00
Aug. 24, 1912	-----	85,000.00
June 23, 1913	-----	150,000.00
Aug. 1, 1914	-----	93,000.00
Total appropriated by the United States	-----	428,000.00
Receipts from sales	-----	319.05
		\$428,319.05
Section "b":		
Feb. 27, 1911	-----	50,000.00
June 23, 1913	-----	50,000.00
Aug. 1, 1914	-----	43,500.00
Total appropriated by the United States	-----	143,500.00
Maintenance of section "a":		
Mar. 4, 1915 (allotment of Sept. 27, 1915)	-----	5,000.00
July 27, 1916	-----	20,000.00
		25,000.00
Total of United States funds	-----	596,819.05

Sections "a" and "c":

Funds contributed by Beaumont navigation district of Jefferson County, Tex., in accordance with provisions of act of Feb. 27, 1911-----	\$428,000.00	
Receipts from sales-----	319.05	\$428,319.05
Funds contributed by Beaumont navigation district of Jefferson County, Tex., in accordance with provisions of act of Mar. 4, 1913-----		7,500.00
Funds contributed by Beaumont navigation district of Jefferson County, Tex., in accordance with provisions of act of Mar. 4, 1915-----		1,000.00
Total-----		436,819.05
Section "b":		
Funds contributed by Orange County navigation district in accordance with provisions of act of Feb. 27, 1911-----	143,500.00	
Total of contributed funds-----	580,319.05	
Deduction on account of amount refunded to Beaumont navigation district-----	810.67	
Net total of contributed funds-----	579,508.38	
Total of United States and contributed funds-----	1,176,327.43	

CONTRACTS IN FORCE.

1.

Name and address of contractor: C. A. McKinley & Sons, Beaumont, Tex.
 Work: Furnishing about 4,200 cubic yards of sand, delivered in barges at landing at lock site in Sabine-Neches Canal near Port Arthur, Tex.
 Contract price: 80 cents per cubic yard delivered.
 Date of approval: March 5, 1913.
 Date of beginning: April 12, 1913. Extended to March 27, 1914.
 Date of expiration: March 12, 1914. Extended to February 24, 1915. Extended for a reasonable period.
 Completed.

2.

Name and address of contractor: The Atlas Portland Cement Co., New York, N. Y.
 Work: Furnishing about 9,000 barrels of Portland cement, delivered on barges alongside of ship which will lie in Sabine-Neches Canal at Port Arthur, Tex.
 Unit price: \$2.05 per barrel of 4 sacks, an allowance of 10 cents per sack to be made for each sack returned, f. o. b. Port Arthur.
 Date of approval: May 6, 1913.
 Date of beginning: June 14, 1913.
 Date of expiration: May 15, 1914. Extended for a reasonable period.
 Completed.

3.

Name and address of contractor: W. D. Haden, Galveston, Tex.
 Work: Dredging approximately 3,355,000 cubic yards; clearing approximately 4 acres. (Section "b," Sabine-Neches Canal, Tex.)
 Contract price: Dredging, \$0.0699 per cubic yard; clearing, \$50 per acre.
 Date of approval: August 27, 1912.
 Date of beginning: December 3, 1912.
 Date of expiration: December 19, 1914.
 A supplemental agreement was entered into March 6, 1915, applying against this contract. This supplemental agreement provided for dredging in addition to that covered by the contract, as follows:

(a) Widen the Sabine-Neches Canal from the Neches River to Sabine Lake, through the land, for a distance of about 2,500 feet, the canal to be made 90 feet bottom width;

(b) Widen the Sabine-Neches Canal across Sabine Lake from shore to shore, a distance of about 19,000 feet, the canal to be made 115 feet bottom width;

(c) Widen the channel to 90 feet bottom width from the mouth of Sabine River through West Pass, a distance of about 2,500 feet;

(d) At the cut-off of the Sabine River just below Orange widen the channel about 75 feet.

All other conditions of the contract remain the same.

Completed.

4.

Name and address of contractor: Chicago Bridge & Iron Works, Chicago, Ill.
Work: Constructing and delivering and erecting at the guard lock in the Sabine-Neches Canal, Tex., two pairs of steel lock gates and fittings.

Contract price: \$24,200.

Date of approval: April 23, 1914.

Date of beginning: May 20, 1914.

Date of expiration: February 28, 1915. Extended for a reasonable period.

Completed.

5.

Name and address of contractor: The Texarkana & Fort Smith Railway Co., Kansas City, Mo.

Work: Leasing to the United States a strip of land of sufficient width to permit of the construction and operation of a standard-gauge spur track near Port Arthur, Tex., approximately 510 feet long, and sufficient rail in place on said strip of land to form a standard-gauge spur track.

Unit price: \$1 per annum.

Date of approval: Lease dated August 1, 1913.

Date of beginning: August 1, 1913.

Date of expiration: July 31, 1915.

Completed.

6.

Name and address of contractor: The Texarkana & Fort Smith Railway Co., Kansas City, Mo.

Work: Leasing to the United States a strip of land of sufficient width to permit of the construction and operation of a standard-gauge track near Port Arthur, Tex., approximately 510 feet long, and sufficient rail in place on said strip of land to form a standard-gauge spur track.

Unit price: \$1 per annum.

Date of approval: Lease dated July 28, 1915.

Date of beginning: August 1, 1915.

Date of expiration: July 31, 1918.

Percentage of completion: 96.

COMMERCIAL STATISTICS.

For commercial statistics see the improvement of the mouths of the Sabine and Neches Rivers, Tex.

4. HARBOR AT SABINE PASS, AND PORT ARTHUR CANAL, TEX.

Under contract with Charles Clarke & Co., of Galveston, Tex., for work on both jetties, in force at the beginning of the year, work was carried on until August 16, 1915, at which time the west jetty had been built up to mean low Gulf level to about station 172 plus 10 (17,210 feet from the shore end of the jetty), and the east jetty to minus 10 feet mean low Gulf level to about station 258 plus 90 (25,890 feet from the shore end of the jetty). On August 16-18,

1915, a tropical hurricane of extraordinary violence passed over this vicinity, causing serious damage to the east jetty, the extent of which, so far as concerns the uncompleted portion of the jetty, is indicated on the accompanying map, which shows in profile and cross section the conditions before and after the storm. The outer 1,400 feet of the jetty, with the exception of what is known as the "Old Rock Pile," at station 250 (25,000 feet from the shore end of the jetty), was entirely destroyed, the depths after the storm being about 5 feet greater than before the jetty was placed. The stone appeared to be distributed in a solid mass over an area approximately 230 feet wide at the widest part, with scattered rock as far out from the original center line of the jetty as 160 to 190 feet in places. The rock appeared to be distributed somewhat more on the Gulf side than on the channel side. The portion of the jetty destroyed included all of the work done under the Clarke contract, as well as a considerable portion of that done under the preceding contract with David M. Picton & Co., dated August 22, 1913. On the finished portion of the jetty there was some displacement of the top stone, but not of sufficient importance to reduce the effectiveness of the jetty, nor to require immediate repairs. The damage to the west jetty was comparatively slight. The completed jetty was not injured at all, but at the end of the jetty, where work was in progress, about 1,500 tons of corestone, which had not been covered with slope stone, was carried away. When work was resumed the damage to the west jetty was repaired and the building up of that jetty continued, the jetty being brought to mean low Gulf level to about station 181 plus 40 (18,140 feet from the shore end of the jetty). Work on the east jetty was limited to filling in the gap between the end of the jetty and the "Old Rock Pile" to about elevation minus 20 feet mean low Gulf level. The contract was completed in November, 1915, the total amount of stone placed during the year being as follows:

		Tons.
West jetty:		
Core stone	-----	15,687.87
Slope stone	-----	5,998.61
East jetty:		
Foundation stone	-----	9,034.68
Core stone	-----	8,210.58
Slope stone	-----	5,347.30

Under an allotment of \$230,000 made on November 26, 1915, a contract was entered into March 14, 1916, with Charles T. Picton, of Rockport, Tex., for building up the east jetty to minus 10 feet mean low Gulf level to about station 252 (25,200 feet from the shore end of the jetty) and extending the slope and foundation to about station 262 (26,200 feet from the shore end of the jetty), the outer end to be wider and the slopes flatter than under former plans. The work under this contract was begun in March, 1916, and to the close of the fiscal year 19,822.85 tons of core stone and 12,777.68 tons of slope and top stone were placed, the jetty having been brought up to minus 10 feet mean low Gulf level to about station 250 plus 75 (25,075 feet from the shore end of the jetty), or practically the same point to which it had been built on June 30, 1915.

The total amount expended on jetty work during the fiscal year was \$228,603.45.

The U. S. seagoing dredge *Sabine* worked almost continuously in the jetty channel and at the mouth of the Port Arthur Canal, except

during the periods January 6-20, 1916, and March 15 to April 10, 1916, when she was undergoing repairs, those during the latter period having been carried on at the New Orleans naval station. The yardage removed was 540,417 (400,992 from the jetty channel and 139,425 from the canal), the total cost being \$38,085.52, or 7 cents per cubic yard. On June 29 this dredge was laid up at the Port Arthur field office on account of exhaustion of funds.

The U. S. pipe-line hydraulic dredge *Orange* worked in the jetty channel from the beginning of the fiscal year to August 9, 1915, widening the channel to 150 feet from near the old quarantine station seaward a distance of 5,400 feet. The total amount of material removed was 195,319 cubic yards, the cost being \$8,418.18, or 4.3 cents per cubic yard.

The same dredge worked in the Port Arthur Ship Canal from September 23 to October 6, 1915, removing 96,142 cubic yards of silt and mud between station 347 (2,800 feet below the head of the canal) and station 302 (7,300 feet below the head of the canal), a linear distance of 4,500 feet. From June 8 to June 30 this dredge removed 58,500 cubic yards from the new turning basin and 56,800 cubic yards from the old turning basin. The total amount expended in this work was \$11,160.09, making the cost per cubic yard of material dredged 5.27 cents.

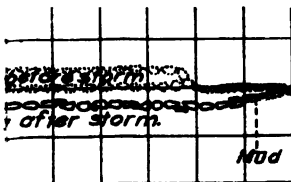
A wooden barge (*No. 6*) 14 feet by 40 feet 2 inches, for use in connection with the operation of the dredge *Orange* for handling anchors, shifting shore pipe, etc., was constructed at the Port Arthur field office, at a cost of \$994.64, of which one-half was charged to the allotment for dredging in Sabine Pass and one-half to that for the maintenance of the Port Arthur Canal.

On February 8, 1916, a contract was entered into with J. J. Kane, of Galveston, Tex., for a steel oil and water barge (*A*) 80 by 20 feet by 5 feet 6 inches, for use in connection with both the dredges *Orange* and *Sabine*, the contract price being \$9,960. At the end of the year the barge was about 40 per cent completed. No payments have been made.

The total amount expended during the year on this project was \$287,261.88.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 68d Cong., 3d sess., p. 539)		\$4, 642, 750. 00
Present project:		
July 25, 1912	\$433, 800. 00	
Mar. 4, 1913	400, 000. 00	
Oct. 2, 1914 (allotment of Oct. 7, 1914)	240, 000. 00	
Mar. 4, 1915 (allotment of Apr. 1, 1915)	100, 000. 00	
Mar. 4, 1915 (allotment of Nov. 28, 1915)	230, 000. 00	
July 27, 1916	590, 000. 00	
		1, 983, 800. 00
Total of appropriations		6, 636, 550. 00
Reverted to surplus fund of Treasury from sundry civil act of June 4, 1897	16, 297. 03	
Reverted to surplus fund of Treasury from river and harbor act of Mar. 3, 1899	1, 194. 56	
		17, 491. 59
Net total		6, 619, 058. 41
Receipts from sales, collections, etc.		3, 941. 31
Grand total		6, 622, 999. 72



Sta. 262.

000 000 Feet

June 30th 1916.

Approved:

W. J. Barden

Major Corps of Engrs.

To accompany Annual Report to the
Chief of Engineers, U.S. Army, for the
fiscal year ending June 30th, 1916.

; 64th Cong., 2d Sess.

CONTRACTS IN FORCE.

1.

Name and address of contractor: Chas. Clarke & Co., Charles Clarke, sole and only proprietor, Galveston, Tex.

Work: Extending east and west jetties, Sabine Pass, Tex.

Date of contract: January 4, 1915.

Date of approval: February 1, 1915.

Date fixed for beginning: May 9, 1915.

Date fixed for completion: November 8, 1915.

Amount of contract: East jetty—stone in foundation, 19,000 tons; stone in core, 18,000 tons; stone in slopes, 5,000 tons. West jetty—stone in core, 18,000 tons; stone in slopes, 6,000 tons. Tons of 2,000 pounds.

Unit price: Foundation stone, \$2.84 per ton; core stone, \$2.86 per ton; slope stone, \$2.86 per ton.

Completed.

2.

Name and address of contractor: Chas. T. Picton, Rockport, Tex.

Work: Building up east jetty at Sabine Pass, Tex.

Date of contract: March 14, 1916.

Date of approval: March 30, 1916.

Date fixed for beginning: July 4, 1916.

Date fixed for completion: January 6, 1917.

Amount of contract: Stone in core, 41,000 tons; stone in slopes and top, 39,000 tons. Tons of 2,000 pounds.

Unit price: Core stone, \$2.65 per ton; slope and top stone, \$3.31 per ton.

Completed at end of fiscal year: 45 per cent.

3.

Name and address of contractor: J. J. Kane, Galveston, Tex.

Work: Construction of the steel oil and water barge A, complete with gate-hoisting gear, and its delivery at Port Arthur, Tex.

Date of contract: February 8, 1916.

Date of approval: February 21, 1916.

Date fixed for commencement: March 9, 1916.

Date fixed for completion: September 5, 1916.

Unit price: \$9,960 for the barge, complete.

Completed at end of fiscal year: 40 per cent.

4.

Name and address of contractor: The South Texas Telephone Co., Port Arthur, Tex.

Work: Leasing one business telephone, with exchange service, in the United States engineer office, Port Arthur, Tex.

Contract price: \$3 per month, payable monthly.

Date of approval: Lease, dated October 1, 1911.

Date of beginning: September 1, 1911.

Date of expiration: September 30, 1916.

Percentage of completion: 95 per cent.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

SABINE PASS.

Vessel classification.

Classes.	American.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers.....	66	198	264	651,690
Sailing vessels.....	13	30	43	47,525
Gasoline.....	3		3	47
Barges.....	39		39	44,489
Unregistered barges.....	40		40	7,325
Total.....	161	228	389	751,066

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt.....	113,486 barrels.....	19,686	\$338,701
Broom corn.....	954 tons.....	954	95,400
Chemicals.....	1,016 tons.....	1,016	50,800
Coal.....	4,083 tons.....	4,083	24,198
Cotton, baled.....	68,375 bales.....	17,777	3,213,625
Cottonseed meal.....	30,899 tons.....	30,899	1,080,415
Iron and steel.....	37,397 tons.....	37,397	1,495,880
Lead, pigs.....	125 tons.....	125	12,500
Lumber.....	87,921,006 feet b. m.....	153,867	2,198,025
Machinery.....	780 tons.....	780	156,000
Merchandise.....	7,200 tons.....	7,200	540,000
Miscellaneous.....	5,168 tons.....	5,168	155,040
Oils:			
Fish.....	2,735 barrels.....	410	41,025
Fuel, gas.....	24,808,140 barrels.....	3,907,282	28,820,361
Lubricating.....	652,863 barrels.....	107,723	5,222,904
Gasoline and kerosene.....	8,768,522 barrels.....	1,881,043	52,611,132
Rapeseed.....	281,350 barrels.....	141	25,980
Rice.....	92,944 sacks.....	8,365	371,776
Shells, oyster.....	107,653 cubic yards.....	107,653	75,357
Staves.....	16,000.....	96	1,600
Sulphur.....	169,170 tons.....	169,170	3,045,060
Tin:			
Pig.....	23 tons.....	23	16,100
Plate.....	119 tons.....	119	9,520
Water.....	2,265,400 gallons.....	9,400	908
Wheat.....	1,053,031 bushels.....	31,591	1,158,334
Total.....		6,001,885	100,524,639

PORT ARTHUR SHIP CANAL.

Vessel classification.

Classes.	Ameri- can.	Foreign.	Total.	Net regis- tered ton- nage.
Registered:				
Steamers.....	53	160	213	520,628
Sailing vessels.....	2	18	20	22,846
Gasoline.....	5		5	81
Barges.....	28		28	21,222
Unregistered barges.....	51		51	8,242
Total.....	139	178	317	573,019

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Asphalt.....	110,725 barrels.....	19,376	\$387,538
Broom corn.....	954 tons.....	954	95,400
Chemicals.....	1,016 tons.....	1,016	50,800
Coal.....	2,256 tons.....	2,256	13,536
Cotton, baled.....	68,375 bales.....	17,777	3,213,625
Cottonseed meal.....	30,899 tons.....	30,899	1,080,415
Ice.....	2,608,000 pounds.....	1,304	13,040
Iron and steel.....	37,386 tons.....	37,386	1,495,440
Lead, pigs.....	125 tons.....	125	12,500
Lumber.....	87,745,006 feet b. m.....	153,554	2,193,625
Machinery.....	797 tons.....	797	159,400
Merchandise.....	7,200 tons.....	7,200	540,000
Miscellaneous.....	5,972 tons.....	5,972	179,160
Oils:			
Fuel, gas.....	18,980,342 barrels.....	2,989,404	21,827,363
Lubricating.....	568,995 barrels.....	93,584	4,551,960
Gasoline and kerosene.....	6,722,278 barrels.....	1,059,758	40,333,668
Rapeseed.....	866 barrels.....	141	25,980
Rice.....	92,944 sacks.....	8,365	371,776
Shells, oyster.....	44,547 cubic yards.....	44,547	31,153
Staves.....	16,000.....	96	1,600
Tin:			
Pigs.....	23 tons.....	23	16,100
Plate.....	119 tons.....	119	9,520
Water.....	6,831,300 gallons.....	28,350	2,732
Wheat.....	1,053,031 bushels.....	31,591	1,158,334
Total.....		4,533,864	77,764,725

5. TRINITY RIVER, TEX.

All construction and survey work on the Trinity River during the fiscal year was seriously delayed by the unusual number and duration of high-water periods.

LOCK AND DAM NO. 7.

Work on Lock and Dam No. 7 was carried on by hired labor during the fiscal year and except for a few minor items was practically completed. The work done included the placing of 471.65 cubic yards of concrete, 500 cubic yards of excavation, the erection of all steel for the pass and weir, and the construction of a storehouse, barn, and fence around the reservation. A railroad spur one-fourth mile long from the Texas Midland Railroad to the site of the lock and dam was maintained. The total amount expended during the year was \$18,823.43.

LOCK AND DAM AT HURRICANE SHOALS.

Work on the lock and dam at Hurricane Shoals was carried on by hired labor during the fiscal year. The abutment was completed and all of the concrete of weir and pier and about 85 per cent of that of the pass. All the weir steel and the anchorages for the pass wickets were placed. Riprap covered with concrete was placed for protection below the dam. Quantities of the principal items were, 2,385.75 cubic yards of concrete, 2,819.6 cubic yards of excavation, 226.7 cubic yards of back fill, and 9,815 square feet of riprap paving. The narrow-gauge railroad, 13.7 miles long from Crockett, Tex., to the site of the lock and dam was maintained and operated. The total amount expended during the year was \$38,029.74.

LOCK AND DAM AT WHITE ROCK SHOALS.

Work on the lock and dam at White Rock Shoals was carried on by hired labor during the fiscal year. The concrete foundation of the pass was completed and all of that of the weir placed. All steelwork of both pass and weir was placed. Paving was placed below the lock and behind the abutment. Below the abutment 104 linear feet of timber protection cribs filled with stone were placed. The lower approach to the lock was excavated. Quantities of the principal items were, 1,025.6 cubic yards of concrete, 3,668.4 cubic yards of excavation, 180 cubic yards of back fill, 9,270 square feet of paving. A railroad spur $1\frac{1}{2}$ miles long from the Missouri, Kansas & Texas Railroad to the site of the lock and dam was maintained. The total amount expended during the year was \$27,257.87.

SURVEY OF TRINITY RIVER FROM ITS MOUTH TO DALLAS.

At the beginning of the fiscal year one party was in the field on the section from Dallas to Lock and Dam No. 7. This party completed its work on August 5, 1916, having taken the topography, cross sections, and midstream profiles for 18.4 miles of river. To complete the determination of the low-water profile, which on ac-

count of high water it had been impracticable to obtain at the time of doing the rest of the field work, gauges were set and one party was started from Lock and Dam No. 7 on August 7 and another one from Hurricane Shoals on August 11, but the work of both parties had to be suspended August 28 on account of high water. To locate and determine roughly the nature of the foundation at each of the proposed lock sites, two boring parties were placed in the field. Party No. 1 began at Lock and Dam No. 7 (mile 461.4) on August 12, 1915, and completed the section to mile 179.7 on November 26. Party No. 2 began at mile 181 on October 19 and completed the section to the mouth of the river on December 18. In the office all field work has been plotted and checked, plans and estimates prepared, and final report submitted. There still remain to be traced a few of the finished sheets. The total amount expended during the year was \$13,331.82.

The physical characteristics of the Trinity River, as disclosed by the survey, may be briefly summarized as follows:

The river rises in north central Texas, and flows approximately 650 miles southeasterly to Galveston Bay. The distance from Dallas to the mouth is 510 miles, and thence across the bay to Galveston, 37 miles. The drainage area is approximately 19,000 square miles, of which approximately 13,000 square miles are below Dallas.

The fall from Dallas to Liberty (mile 41.4) is approximately 370 feet, or 0.8 foot per mile. From Liberty to the mouth the fall is only about 1.1 feet at low water. The river valley is usually from 3 to 7 miles in width, but at several points is less than 1 mile wide. It is 30-150 feet lower than the adjoining high ground. The river flows through this valley in a tortuous course, frequently abutting the bluffs on one side or the other. The banks proper vary in height from 20 to 50 feet, the low banks being found in the upper and lower 100 miles. As the river approaches its mouth, the banks rapidly decrease in height. At Wallisville (mile 6) they are flooded at high tide, and most of the land on both sides of the river is marshy. Throughout the entire length of the river the banks (except at the bluffs) are overflowed during high-flood stages, the highest being covered to a depth of about 4 feet. The capacity of the river channel is probably not over 20 per cent of the extreme flood discharge. The width between banks varies from a minimum of less than 150 feet in the upper section to a maximum of over 500 feet in the lower section, the average being about 300 feet. The extreme low-water width varies from 40 feet to about 200 feet.

Above about mile 160, the bed and banks are fairly stable. The banks are what is locally known as "black waxy" soil underlaid with clay, shale, or rock, and the shoals are generally gravel, rock, or hardpan. Below that point there are many caving banks and sand bars are numerous. The river itself is unstable in this lower section, and frequent cut-offs have occurred in the past, but the changes do not appear to occur very rapidly. A comparison of the present survey with that of 1899 shows that only two actual cut-offs have occurred during that period.

At low water tidal influence extends about 50 miles above the mouth, the tidal range at the mouth being about one-half foot. At low water there is a 6-foot depth from inside the bar at the mouth

to about mile 87, and thence to Liberty about 3.5 feet. Above Liberty the depth rapidly decreases, depths over many of the shoals being a few inches only, these being impassable except with difficulty for even skiffs and flatboats.

Study of the data now available indicates that the conclusions formerly reached, to the effect that complete canalization of the river, including the lower 46 miles, would be necessary to secure anything other than intermittent navigation, is correct. Observation and experience indicate that open-river navigation would be impracticable at stages of less than about 11 feet on the Long Lake gauge and 8 feet on the Riverside and Liberty gauges. These stages prevailed in the last 11 years as follows:

At Long Lake: An average of 125.6 days per year in 8.2 periods, the maximum being 247 days in 12.5 periods, and the minimum 22 days in 5 periods.

At Riverside: An average of 115.7 days per year in 6.7 periods, the maximum being 204 days in 4.5 periods, and the minimum 5 days in 3 periods.

At Liberty: An average of 164.3 days per year in 7 periods, the maximum being 273 days in 8 periods, and the minimum 38 days in 8 periods.

It is evident that these periods are too short in duration and too uncertain as to time of occurrence to justify any serious attempts at navigation on a large scale.

Neither would a partial system of locks and dams be effective, as the facts appear to be that the slope is fairly uniform, and that as the river falls numerous shoals appear at substantially the same time. The elimination of some would only demonstrate the existence of others at very slightly lower stages, and therefore would not materially increase the open river navigation periods.

As the sufficiency of the water supply for an all-year-round navigation by the construction of locks and dams had been previously questioned, considerable study was given to this matter, but no definite conclusions could be reached. It appears that wet and dry periods alternate in cycles of more or less regular duration, and that during the former the water supply would be sufficient for a reasonable number of lockages for the greater part and sometimes all of the year, whereas in the latter the navigable period would probably be less than eight months, and that in discontinuous periods of irregular lengths.

Seven locks having already been constructed, with available length of 140 feet and chamber width of 50 feet, the lowest at White Rock Shoals, mile 179.7, those dimensions may be considered as fixed for future construction above that point. The nine locks below might be increased in size if the advantages were commensurate with the increased cost. But it is not thought that this would be the case. The main object of the proposed improvement is through navigation to Dallas, and all boats and barges probably would be built for the upper river navigation. The only advantage then would seem to be a possible saving in the number of lockages if tows were combined in the lower river.

The most important factor in the development of the Trinity River valley lands being protection from flood overflows, movable dams are considered essential, and the Chanoine wicket type has been found most suitable for this river. The dimensions of locks and type of dam being thus fixed, it becomes merely a question of so selecting the location of the necessary additional locks and dams as to

keep the number and cost as low as possible. A careful study of the situation indicates that the river can be completely canalized by the construction of 27 locks and dams and 2 auxiliary dams to close cut-offs. The complete cost of canalization, including necessary clearing of the river, is estimated at \$13,444,800, in addition to the amounts heretofore expended, and the necessary operation and maintenance after completion, \$300,000 per annum.

The general design of the proposed locks and dams differs from those already built only in the following items:

- (a) Guide walls 100 feet long have been added above and below the lock.
- (b) Additional paving has been provided above, below, and back of the lock.
- (c) The masonry of the abutments has been lengthened, the wing walls carried further into the banks, and additional paving provided above, below, and in rear of the abutments.
- (d) Riprap protection has been added below dams and locks, and along the abutments, river walls of locks, and lower guide walls.

Experience has indicated these additional features as desirable.

Locks and Dams Nos. 1 and 6 and 2 and 4 were started by contract, but the contractors on Nos. 6, 2, and 4 defaulted, and the work was completed by the United States. The reported costs are believed to be much under the actual expenditures as the contractors undoubtedly lost considerable money in each case. Lock and Dam No. 7 and the locks and dams at Hurricane and White Rock Shoals were built entirely by hired labor. Lock and Dam No. 7 is within a few hundred yards of the Texas Midland Railroad, and materials were delivered on a spur by the railroad without extra charge. The foundation was shale. The cost will be practically the full amount of the authorization, \$248,821.92. At White Rock Shoals the site is 1.7 miles from the Beaumont & Great Northern Railroad (Missouri, Kansas & Texas Railway). A full-gauge track was constructed to the site by the United States, and materials were delivered by the railroad at a switching charge of only \$2 per car. The foundation is sand rock. It is hoped that the work can be completed within the amount available, viz, \$260,307.54. At Hurricane Shoals the site is 13.7 miles from the International & Great Northern Railway, at Crockett. A narrow-gauge track was built and materials hauled to the site by the United States. The foundation is marl. The work will probably be completed within the authorized amount, viz, \$480,004.75.

It is not thought that as favorable conditions as existed at No. 7 and at White Rock Shoals will be found in future work. Most of the locks and dams to be built will require the construction and operation of narrow-gauge railways 4 to 15 miles in length, since hauling over the dirt roads is out of the question, and for several the materials will first have to be hauled over such a road to a completed lock, and there transferred to boat and barge and transported upstream to the site of the work. At only 11 of the sites investigated was suitable rock or hardpan for foundations indicated, and pile foundations will be required at the remaining sites. The guide walls and additional protection above referred to will somewhat increase the cost. It is therefore believed that the cost of the lock and dam at Hurricane Shoals more nearly represents the cost of future construction on the upper river than that of No. 7 and White Rock Shoals. The lower river is wider, the banks and foundations less

stable, the low-water stages shorter, and the cost of the locks and dams in that section will be materially higher.

Estimates are based on doing the work by hired labor, and on the assumption that all necessary sites and rights of way will be furnished without cost to the United States, and that appropriations will be made yearly, starting with an initial appropriation of about \$375,000 and increasing to about \$1,000,000, which would permit of economical prosecution of the work and completion of the project in approximately 15 years.

As already indicated, the most important problem in this valley is the protection of the rich bottom lands from floods, since this is essential for the proper development of the valley. This can best be done by the construction of levees as conditions justify. Under a recent State law authorizing the formation of levee districts, several districts have been formed and some work undertaken. This work, however, has no very immediate connection with an improvement by locks and dams, provided the levees are so located as to cause no radical changes in the regimen of the river, and such location can be required under existing law.

OPEN-CHANNEL WORK.

The snag boat *Trinity* worked in the lower river (from the mouth to mile 53) the entire year, except during the period from April 13 to May 16, when she was undergoing repairs at Lynchburg. The work done was as follows:

Number of miles worked over.....	53
Snags destroyed.....	1,595
Stumps destroyed.....	150
Shore snags cut.....	876
Logs removed from channel.....	1,184
Jams removed.....	2
Side jams removed.....	1
Leaning trees cut.....	6,804
Trees girdled.....	71

In August, September, and October a party cleared the river from Dallas (mile 510) to Lock and Dam No. 2 (mile 487.5). Work done was as follows:

Number of miles worked over.....	23.5
Snags destroyed.....	510
Stumps destroyed.....	99
Shore snags cut.....	1,540
Logs removed from channel.....	16
Leaning trees cut.....	66

In the latter part of June, quarter boat No. 4 was placed in commission and a small snagging party started upstream from Kickapoo Shoals (mile 272.5). The work done was as follows:

Number of miles worked over.....	1
Shore snags cut.....	3
Logs removed from channel.....	1
Side jams removed.....	2
Leaning trees topped.....	2

Quarter boat No. 1, being no longer serviceable, was by proper authority dropped from the returns and is to be used as a bunk house at the lock and dam at White Rock Shoals. The total amount expended during the year on this work was \$16,481.37.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 569)		\$7,000.00
Present project:		
June 18, 1902	\$125,000.00	
Mar. 8, 1903	250,000.00	
June 30, 1906	111,000.00	
Mar. 2, 1907	75,000.00	
Mar. 4, 1907	75,287.00	
May 27, 1908	90,000.00	
Mar. 8, 1909 (allotted Apr. 2, 1909)	75,000.00	
Mar. 4, 1909	125,000.00	
June 25, 1910	184,000.00	
June 25, 1910	85,000.00	
Feb. 27, 1911	40,000.00	
July 25, 1912	440,000.00	
Mar. 4, 1913	270,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	203,000.00	
Mar. 4, 1915 (allotted Apr. 1, 1915)	37,000.00	
July 27, 1916	300,000.00	
		2,485,287.00
Total		2,492,287.00
Received from citizens of Dallas, Tex.		66,000.00
Total of United States and contributed funds		2,558,287.00
Received from sales		10,527.81
Grand total		2,568,814.81

CONTRACTS IN FORCE.

1.

Name and address of contractor: F. A. Smith and wife, Rosetta Smith, Crockett, Tex.

Work: Leasing strip of land situated in Houston County, Tex., as right of way for narrow-gauge railway.

Contract price: \$1 per annum.

Date of approval: Lease dated December 16, 1911.

Date of beginning: December 1, 1911.

Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.

Percentage of completion: 85.

2.

Name and address of contractor: Mrs. Sue Smith, a feme sole, Crockett, Tex.

Work: Leasing strip of land situated in Houston County, Tex., as right of way for narrow-gauge railway.

Contract price: \$75 in one payment to cover entire period of lease.

Date of approval: Lease dated December 16, 1911.

Date of beginning: December 1, 1911.

Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.

Percentage of completion: 85.

3.

Name and address of contractor: Daniel & Burton, Crockett, Tex.

Work: Leasing strip of land situated in Houston County, Tex., as right of way for narrow-gauge railway.

¹ Spent on survey.

² Of this amount \$250,000 was conditional on the contribution of \$50,000 by the city of Dallas or other local interests.

Contract price: \$30 per annum.
Date of approval: Lease dated December 16, 1911.
Date of beginning: December 1, 1911.
Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.
Percentage of completion: 85.

4.

Name and address of contractor: J. T. Simmons and wife, M. E. Simmons, Crockett, Tex.
Work: Leasing strip of land in Houston County, Tex., as right of way for narrow-gauge railway.
Contract price: \$25 per annum.
Date of approval: Lease dated December 16, 1911.
Date of beginning: December 1, 1911.
Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.
Percentage of completion: 85.

5.

Name and address of contractor: H. J. Arledge, Crockett, Tex.
Work: Leasing strip of land in Houston County, Tex., as right of way for narrow-gauge railway.
Contract price: \$1 for the period of the lease.
Date of approval: Lease dated January 2, 1912.
Date of beginning: January 2, 1912.
Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.
Percentage of completion: 85.

6.

Name and address of contractor: J. W. Hall, Crockett, Tex.
Work: Leasing strip of land in Houston County, Tex., as right of way for narrow-gauge railway.
Contract price: \$1 for the period of the lease.
Date of approval: Lease dated January 2, 1912.
Date of beginning: January 2, 1912.
Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.
Percentage of completion: 85.

7.

Name and address of contractor: Sol Woods, Crockett, Tex.
Work: Leasing strip of land in Houston County, Tex., as right of way for narrow-gauge railway.
Contract price: \$25 for the period of the lease.
Date of approval: Lease dated January 2, 1912.
Date of beginning: January 2, 1912.
Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.
Percentage of completion: 85.

8.

Name and address of contractor: Sol Woods, Crockett, Tex.
Work: Leasing strip of land in Houston County, Tex., as right of way for narrow-gauge railway.
Contract price: \$75 for the period of lease.
Date of approval: Lease dated January 3, 1912.
Date of beginning: January 2, 1912.
Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.
Percentage of completion: 85.

9.

Name and address of contractor: The estate of J. C. Wootters, deceased; A. H. and R. H. Wootters, administrators.

Work: Leasing strip of land in Houston County, Tex., as right of way for narrow-gauge railway.

Contract price: \$1 for the period of lease.

Date of approval: Lease dated January 25, 1912.

Date of beginning: January 25, 1912.

Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.

Percentage of completion: 85.

10.

Name and address of contractor: J. R. & L. M. Estes, Crockett, Tex.

Work: Leasing strip of land in Houston County, Tex., as right of way for narrow-gauge railway.

Contract price: \$1 for the period of lease.

Date of approval: Lease dated January 25, 1912.

Date of beginning: January 25, 1912.

Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.

Percentage of completion: 85.

11.

Name and address of contractor: Frank E. Kalb, Crockett, Tex.

Work: Leasing strip of land in Houston County, Tex., as right of way for narrow-gauge railway.

Contract price: \$75 for the period of lease.

Date of approval: Lease dated April 5, 1912.

Date of beginning: March 22, 1912.

Date of expiration: The date of completion of the lock and dam at Hurricane Shoals, Trinity River, Tex.

Percentage of completion: 85.

12.

Name and address of contractor: W. A. Bell, Trinity, Tex.

Work: Leasing one telephone line from Trinity, Tex., to lock and dam at White Rock Shoals, with telephone set and telephone service.

Contract price: \$2.50 per month for the leased telephone line, the telephone set, and the usual local service pertaining thereto; for long-distance service, the published tariff of the Southwestern Telegraph & Telephone Co. plus 25 cents for each call.

Date of approval: Lease dated August 15, 1912.

Date of beginning: September 1, 1912.

Date of expiration: Lease to run for such period as may be necessary.

Percentage of completion: 95.

13.

Name and address of contractor: The Missouri, Kansas & Texas Railway Co. of Texas, Dallas, Tex.

Work: Leasing to the United States 2,900 track feet of rail in place and forming a spur from the Beaumont & Great Northern Railroad at Shoals, Tex., to the site of the lock and dam at White Rock Shoals, Trinity River, Tex.

Unit price: \$80.64 per annum, payable annually.

Date of lease: September 1, 1914.

Date of beginning: August 1, 1914.

Date of expiration: July 31, 1915.

Completed.

14.

Name and address of contractor: J. W. Wright, Crockett, Tex.

Work: Leasing to the United States a strip of land as right of way for the Government narrow-gauge railroad from Crockett to Hurricane Shoals.

Unit price: \$12.50 per annum.

Date of lease: December 16, 1914.
Date of beginning: December 1, 1914.
Date of expiration: November 30, 1915.
Completed.

15.

Name and address of contractor: James A. Baker and Cecil A. Lyon, as receivers for the International & Great Northern Railway Co., Houston, Tex.

Work: Leasing to the United States a piece of land at Crockett station, on the International & Great Northern Railway, to be used as site for a tramroad and supply yard.

Unit price: \$35 per annum.
Date of lease: December 21, 1914.
Date of beginning: January 2, 1915.
Date of completion: January 1, 1916.
Completed.

16.

Name and address of contractor: J. F. Dabney, Liberty, Tex.

Work: Leasing to the United States a warehouse at Liberty, Tex.

Unit price: 50 cents per month.
Date of lease: January 22, 1915.
Date of beginning: January 1, 1915.
Date of expiration: Lease to run for such period as may be necessary.
Percentage of completion: 5.

17.

Name and address of contractor: E. W. Brock and M. E. Brock, his mother, Trinity, Tex.

Work: Leasing a strip or parcel of land in Trinity County, Tex., for right of way for broad-gauge railroad.

Unit price: \$25 for the period of lease.
Date of approval: Lease dated June 26, 1915.
Date of beginning: June 26, 1915.
Date of expiration: June 25, 1916.
Completed.

18.

Name and address of contractor: The Missouri, Kansas & Texas Railway Co. of Texas, Dallas, Tex.

Work: Leasing to the United States 2,900 track feet of rail in place and forming a spur from the Beaumont & Great Northern Railroad at Shoals, Tex., to the site of the lock and dam at White Rock Shoals, Trinity River, Tex.

Unit price: \$40.32 for period of lease.
Date of lease: August 2, 1915.
Date of beginning: August 1, 1915.
Date of expiration: January 31, 1916.
Completed.

19.

Name and address of contractor: J. W. Wright, Crockett, Tex.

Work: Leasing to the United States a strip of land as right of way for the Government narrow-gauge railroad from Crockett to Hurrican Shoals.

Unit price: \$6.25 per half year, payable semiannually in advance.
Date of lease: November 10, 1915.
Date of beginning: December 1, 1915.
Date of expiration: May 31, 1916.
Completed.

20.

Name and address of contractor: James A. Baker and Cecil A. Lyon, as receivers for the International & Great Northern Railway Co., Houston, Tex.

Work: Leasing to the United States a piece of land at Crockett Station, on the International & Great Northern Railway, to be used as site for a tram-road and supply yard.

Unit price: \$35 per annum.

Date of lease: January 8, 1916.

Date of beginning: January 2, 1916.

Date of expiration: January 1, 1917.

Percentage of completion: 50.

21.

Name and address of contractor: M. D. Glaspy, Ennis, Tex.

Work: Leasing to the United States a corner of land lying between the Texas Midland Railroad and the land owned by the United States at Lock and Dam No. 7, Trinity River, Tex.

Unit price: \$50 per half year, payable semiannually in advance.

Date of lease: June 13, 1916.

Date of beginning: June 20, 1916.

Date of expiration: December 18, 1916.

Percentage of completion: 5.

22.

Name and address of contractor: E. W. Brock and M. E. Brock, his mother, Trinity, Tex.

Work: Leasing to the United States a strip or parcel of land in Trinity County, Tex., for right of way for broad-gauge railroad.

Unit price: \$12.50 per half year, payable semiannually in advance.

Date of lease: June 15, 1916.

Date of beginning: June 26, 1916.

Date of expiration: December 25, 1916.

Percentage of completion: 2.5.

23.

Name and address of contractor: J. W. Wright, Crockett, Tex.

Work: Leasing to the United States a strip of land as right of way for the Government narrow-gauge railroad from Crockett to Hurricane Shoals.

Unit price: \$6.25 per half year, payable semiannually in advance.

Date of lease: June 15, 1916.

Date of beginning: June 1, 1916.

Date of expiration: November 30, 1916.

Percentage of completion: 16½.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Freight traffic.

OLD (TRINITY) RIVER, TEX.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Charcoal.....	1,900 sacks.....	29	\$570
Chickens.....	84 dozen.....	1	504
Cordwood.....	180 cords.....	180	450
Cotton.....	183 bales.....	48	8,601
Cotton seed.....	10 tons.....	10	250
Eggs.....	7,620 dozen.....	6	1,524
Fertilizer.....	24 tons.....	24	433
Grain.....	20,000 bushels.....	500	15,000
Hides and skins.....	148.....	1	522
Live stock.....	50 head.....	15	1,000
Lumber.....	92,000 feet b. m.....	161	1,840
Miscellaneous.....	12 tons.....	12	360
Provisions.....	267 tons.....	267	12,320
Shingles.....	15,000.....	2	75
Square timber.....	50,000 feet b. m.....	88	1,000
Total.....		1,404	45,548

Freight traffic—Continued.

TRINITY RIVER, TEX.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Charcoal.....	33,100 sacks.....	407	\$9,940
Chickens.....	142 dozen.....	2	352
Cordwood.....	104 cords.....	104	260
Cotton.....	275 bales.....	72	12,925
Eggs.....	1,410 dozen.....	1	282
Fertilizer.....	2 tons.....	2	36
Grain.....	12,205 bushels.....	342	9,154
Hides and skins.....	444.....	4	1,776
Lumber.....	980,049 feet b. m.....	1,715	19,000
Miscellaneous.....	2 tons.....	2	60
Posts (fence).....	1,000.....	18	200
Provisions.....	531 tons.....	531	26,550
Shingles.....	30,000.....	4	150
Spokes.....	50.....		1
Saw logs by raft.....	1,239,569 feet b. m.....	2,204	3,149
Total.....		5,498	\$4,935

All of the above tonnage, except the rafting of logs, originated at or below Liberty, Tex.

6. OPERATING AND CARE OF LOCKS AND DAMS, TRINITY RIVER, TEX.

Operations during the year under this project were limited to works of maintenance and of minor repairs, except at Lock and Dam No. 1 and at Parsons Slough Dam. At Lock and Dam No. 1 a sudden rise in the river occurred in June, 1915, when the dam was being raised. It was impossible to lower the dam and the fall over it caused serious erosion of the bank behind the abutment and the lower wing wall of the lock. To repair this damage and to pave an area behind the land wall which had not previously been covered, a special allotment of \$7,000 was made. The work was completed at a cost of \$4,783.25, the principal items being: 21,000 square feet of new riprap covered with concrete grout, 2,830 square feet of old paving covered with concrete grout and 2,850 cubic yards of back fill. This dam is of the Boulé type and the trestles are so badly eroded as to seriously impair their strength. Furthermore, this type of dam has been found unsuitable for a river of as quick rises and carrying as much drift as the Trinity. For these reasons the reconstruction of the dam, changing the type to the Chanoine wicket, has been authorized at an estimated cost of \$37,000. The sills and anchorages have been purchased and plans and specifications for the remainder of the iron and steel work prepared and forwarded for approval. At Parsons Slough work on the special repairs in progress at the beginning of the year was completed. The principal items were:

Rubble masonry.....	.....cubic yards..	379
Riprap paving, 3 feet thick, covered with concrete grout.....	.....square feet..	408
Riprap paving, 2 feet thick, covered with concrete grout.....	.....do.....	1,563
Riprap paving, 1 foot thick, covered with concrete grout.....	.....do.....	3,035
Old riprap paving covered with concrete grout.....	.....do.....	2,064
Excavation.....	.....cubic yards..	1,633
Back fill.....	.....do.....	820

The total cost of this work was \$8,910, of which \$8,088.25 was expended during the fiscal year. A maneuver boat (provided with a clam-shell bucket) was built at Lock and Dam No. 7 for Lock and

Dam No. 4 at a cost of \$1,689.28, and considerable dredging has been done at Locks and Dams Nos. 6 and 4 to remove deposits in the lock chambers and approaches. There were three lockages during the year at Lock No. 1 and three at Lock No. 6. The boats passing were two small gasoline launches and the U. S. maneuver boat *No. 6*. The total expenditures for the year amounted to \$26,160.10.

EXPENDITURES.

1909-----	\$3,518.71	1914-----	\$8,899.61
1910-----	7,428.22	1915-----	14,505.27
1911-----	5,671.65	1916-----	26,160.10
1912-----	3,951.98		
1913-----	6,598.02	Total-----	78,899.56

CONTRACTS IN FORCE.

Name of contractor: Southwestern Telegraph & Telephone Co.

Work: Leasing one telephone line $3\frac{1}{2}$ miles long; one telephone set with exchange service at each of the Government stations connected with the leased line; one business telephone with exchange service in the United States Engineer office, Dallas, Tex.; two auxiliary telephones connected with said business telephone.

Contract price: \$1 per month per mile for the leased telephone line; \$2 per month for each instrument in the Government stations on the leased line; \$5 per month for the business telephone in the United States Engineer office, Dallas, Tex.; \$1 per month for each auxiliary telephone connected to said business telephone.

Date of approval: Lease, dated October 1, 1911.

Date of beginning: September 1, 1911.

Date of expiration: Lease to run for such period as may be necessary.

COMMERCIAL STATISTICS.

There was no commerce carried on in this section of the river. The gasoline tug *Commodore Duncan* made one trip to Galveston and return for repairs and there are one or two small gasoline launches that occasionally make short trips.

7. CYPRESS BAYOU AND WATERWAY BETWEEN JEFFERSON, TEX., AND SHREVEPORT, LA.

Quarter boat *No. 2* worked over the waterway between Mooringsport and Jefferson from July 7, 1915, to January 31, 1916, when it was laid up at the Caddo Lake Dam on account of exhaustion of funds. The work done was as follows:

Miles worked over-----	28.5
Snags destroyed-----	340
Logs destroyed-----	494
Stumps destroyed-----	182
Shore snags cut-----	1,048
Leaning trees cut-----	171
Square yards of brush cut-----	1,975
Trees girdled-----	960
Channel markers placed-----	146

The total amount expended was \$4,036.52.

² Erroneously reported in last Annual Report as \$14,500.52.

APPROPRIATIONS.

June 10, 1872	\$10,000.00
Mar. 3, 1873	50,000.00
Aug. 14, 1876	13,000.00
June 18, 1878	15,000.00
Mar. 3, 1879	6,000.00
Aug. 5, 1886	18,000.00
Aug. 11, 1888 (allotted from appropriation for Red River)	5,000.00
Sept. 19, 1890 (survey)	10,000.00
July 13, 1892 (survey)	2,000.00
July 13, 1892 (allotted from appropriation for Red River)	1,701.83
Aug. 18, 1894	10,000.00
June 3, 1896	5,000.00
Mar. 2, 1907	10,000.00
Mar. 3, 1909 (allotted Apr. 2, 1909)	6,000.00
June 25, 1910	5,000.00
June 25, 1910 (construction of dam)	100,000.00
Feb. 27, 1911	2,500.00
July 25, 1912	5,000.00
Mar. 4, 1913	500.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	2,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	5,000.00
July 27, 1916	5,000.00
	286,701.33
Receipts from sales	306.00
Total	287,007.33

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Boilers	310,000 pounds	155	\$23,250
Cement	2,867 sacks	136	1,357
Charcoal	4,925 sacks	74	1,477
Cordwood	42 cords	42	105
Crude oil	295 barrels	47	339
Drilling rigs	766,900 pounds	383	38,300
Engines	822,100 pounds	411	82,210
Fittings	285,610 pounds	118	28,561
Grain	1,167 bushels	33	875
Hay	146,380 pounds	73	1,022
Ice	93,900 pounds	47	376
Lumber	680,000 feet b. m.	1,155	13,200
Machinery	153,000 pounds	77	15,400
Miscellaneous	884,595 pounds	442	13,260
Oats	7,901 bushels	126	3,951
Oil-well supplies	604,935 pounds	302	30,200
Piling	355	80	888
Pipe	7,007,666 pounds	3,504	280,320
Pipe fittings	38,500 pounds	19	3,850
Poles	200	25	800
Pumps	206 140 pounds	103	20,614
Railroad ties	62,800	1,878	31,300
Rods	307,510 pounds	154	9,225
Sand	525 tons	525	525
Saw logs	346,000 feet b. m.	641	915
Shingles	1,280,000	160	6,400
Square timber	238,000 feet b. m.	417	4,760
Tools	48,900 pounds	24	4,890
Tubing	567,020 pounds	284	28,351
Total		11,444	641,361

8. OPERATING AND CARE OF DAM AT FOOT OF CADDO LAKE, LA.
AND TEX.

Operations during the year under this project were limited to maintaining a dam tender at the dam and purchasing and placing 405.44 tons of riprap stone below the dam for protection against wash due to overfall. Additional protection is necessary.

EXPENDITURES.

1915.....	\$902. 42
1916.....	2, 986. 19
Total.....	3, 888. 61

COMMERCIAL STATISTICS.

See Cypress Bayou and Waterway between Jefferson, Tex., and Shreveport, La., for commerce carried on above the dam. Although not intended to provide for through navigation, a number of motor boats, one small barge, and one house-boat passed over the dam at high-water stages, the list being as follows:

Boats.	Down- stream.	Up- stream.	Total.
Motor boats.....	11	5	16
Barges.....	1		1
House-boats.....		1	1

No freight was carried.

9. RED RIVER FROM FULTON, ARK., TO MOUTH OF WASHITA
RIVER, OKLA.

The combined dredge and snag boat *Denison* was completed on August 14 and arrived at Fulton, October 1, 1915. From November to the end of the year this boat worked over the river from miles 66 to 79 and 98½ to 157.

The U. S. snag boat *C. A. Culberson* worked during the entire year over miles 8-66 and 79-85. On June 30 both of these boats were laid up at Fulton on account of exhaustion of funds. Quarter boat *No. 3* began work in November, 1915, at Arthur City (mile 184) and by the end of June had worked over the entire upper river to *Denison* (about mile 280), where it was laid up.

The work accomplished by these boats was as follows:

Snags destroyed.....	4, 093
Stumps destroyed.....	419
Shore snags cut.....	15, 506
Logs removed from channel.....	630
Side jams removed.....	4
Leaning trees cut.....	60, 296

The total amount expended during the year was \$67,714.84, of which approximately \$32,210 was for the *Denison*, making the approximate total cost of that boat \$52,000.

The contractor for the boat refunded at the time of final payment \$26.85 to cover cost of several items of equipment not furnished. Of this amount \$18.50 was subsequently returned, the remainder being spent for the missing items. This transaction does not appear in the money statements.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 586) \$347,000.00

Present project:

July 25, 1912.....	\$75,000.00	
Mar. 4, 1918.....	42,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914).....	15,000.00	
Mar. 4, 1915 (allotted Apr. 1, 1915).....	40,000.00	
July 27, 1916.....	50,000.00	
		222,000.00

Total of appropriations..... 569,000.00

Feb. 23, 1901, received from sale of snag boat..... 1,500.00

Received from other sales..... 259.20

1,759.20

Grand total..... 570,759.20

CONTRACTS IN FORCE.

Name and address of contractor: Dubuque Boat & Boiler Works, Dubuque, Iowa.

Work: Constructing and delivering the stern-wheel steel-hull combined dredge and snag boat *Denison*, afloat at the contractor's yard at Dubuque, Iowa.

Date of contract: July 6, 1914.

Date of approval: July 18, 1914.

Date fixed for beginning: August 6, 1914.

Date fixed for completion: May 23, 1915 (extended for a reasonable period).

Amount: \$49,475.

Completed.

COMMERCIAL STATISTICS.

[Calendar year 1915.]

KIAMICHI RIVER, OKLA.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Ash bolts for handles.....	500 cords.....	500	\$2,500
Cordwood.....	20 cords.....	20	80
Grain.....	100 bushels.....	8	75
Hides and skins.....	200.....	2	800
Lumber.....	10,000 feet b. m.....	18	200
Provisions.....	50 tons.....	50	2,500
Posts (fence).....	10,000.....	175	2,000
Railroad ties.....	1,000.....	30	500
Saw logs.....	8,000 feet b. m.....	14	20
Total.....		512	8,645

RED RIVER ABOVE FULTON, ARK.

Hardware.....	2 tons.....	2	\$400
Lumber.....	22,000 feet b. m.....	39	440
Lumber, oak.....	24,000 feet b. m.....	48	1,440
Rock.....	300 tons.....	300	750
Saw logs by raft.....	500,000 feet b. m.....	875	1,250
Total.....		1,264	4,280

The saw logs were handled between Index, 17 miles above Fulton, and Garland, 50 miles below Fulton. The other items were all handled in the immediate vicinity of Fulton.

10. SULPHUR RIVER, TEX. AND ARK.

No funds were available and no work was done during the year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 560) --	\$2,488.99
Present project:	
Mar. 2, 1907-----	\$36,000.00
June 25, 1910-----	7,500.00
	<hr/>
	43,500.00
Total-----	<hr/>
	45,988.99

IMPROVEMENT OF RIVERS AND HARBORS IN THE VICKSBURG, MISS., DISTRICT.

REPORT OF MAJ. HAROLD C. FISKE, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Red River, La. and Ark., below Fulton, Ark.....	2537	6. Bayou Bartholomew, Boeuf River, Texas River and Bayou Macon, and Bayous D'Arbonne and Corney, La. and Ark.....	2548
2. Ouachita and Black Rivers, Ark. and La.....	2540	7. Yazoo, Tallahatchie, Coldwater, and Big Sunflower Rivers, Tchula Lake, Steele and Washington Bayous, and Lake Washington, and Bear Creek, Miss.....	2552
3. Operating and care of locks and dams, Ouachita River, Ark. and La.....	2546		
4. Ouachita River above Camden to Arkadelphia, Ark.....	2547		
5. Saline River, Ark.....	2547		

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 1015 TO 1055.

1. RED RIVER, LA. AND ARK., BELOW FULTON, ARK.

MAINTENANCE.

The U. S. snag boat *C. W. Howell* was employed almost continuously in removing obstructions from this stream during the fiscal year. Work was performed between Fulton, Ark., and the mouth of Black River, La., a distance of 447 miles, and many portions of the river were worked over twice. In February, 1916, the river below Garland, Ark., and in the lower portion near the mouth overflowed a considerable section of country, and the *Howell* was engaged in saving life and property. The following is a summary of the work done by this boat during the fiscal year:

Snags pulled.....	2,952
Stumps pulled and destroyed.....	682
Shore snags cut.....	189
Leaning trees cut.....	1,798
Side jams removed.....	81
People removed from overflow.....	10
Live stock removed from overflow.....	183
Cost per obstruction removed.....	\$5.01

The U. S. snag boat *Jos E. Ransdell* was stationed in this river February 10 to 15, 1916, to be ready to save life and property endangered by flood if required. Only two families were found who wished to be moved to high ground.

The U. S. hydraulic dredge *Waterway* began work on the bar just below Alexandria, La., 117 miles above the mouth of the river, September 17, 1915, and by October 22 had completed cuts with a

total length of 8,450 feet, an average width of 60 feet, and an average depth of 10 feet. At this place 59,592 cubic yards of sand and clay were removed. Operations were suspended by a rise in the river, and were recommenced November 17 at Big Larto Lake, La., 38.2 miles above the mouth. Here cuts were made with an aggregate length of 700 feet, average width of 60 feet, and average depth of 18 feet, about 10,000 cubic yards of clay being removed. This work was finished November 29. The dredge was employed in the reach above Barbin Landing, La., 67.6 miles above the mouth, from December 1, 1915, to January 3, 1916, where cuts were made 1,410 feet long, with average width of 70 feet and average depth of 11 feet. Sand and clay to an aggregate amount of 33,000 cubic yards was removed. January 5 the *Waterway* dredged 3,044 cubic yards from a hard-clay point near Vick Landing, La., 66 miles above the mouth, after which operations were suspended on account of high water. The cost per cubic yard of material dredged was 8.98 cents. February 16 to 17, 1916, the *Waterway* proceeded from Alexandria to mouth of Black River, La., for the purpose of rescuing persons or stock endangered by overflow, but found no assistance to be needed on this river. While not in service, this dredge was laid up near Alexandria, La. It was properly cared for during the year, and all repairs required to keep the boat in serviceable condition were made.

The U. S. snag boat *Columbia* and quarter boats *Nos. 5* and *9* were laid up near Alexandria, La., during the entire fiscal year, as they were not in condition to be used during the low-water season. New steel hulls for the quarter boats were built and the old cabins transferred to them; the work being completed in January, 1916. This work was done by hired labor. The cost for *No. 5* was \$1,262.09, and for *No. 9*, \$1,373.71. Proposals for steel for rebuilding the hull of the *Columbia* so largely exceeded the estimate that all were rejected and the work was postponed.

Of the expenditures during the fiscal year for maintenance, \$12,203.58 was used for dredging.

LEVEES.

August 25, 1915, the Chief of Engineers authorized the division of the balance of \$14,483.01 remaining of the allotment for construction of levees from the appropriation for this work in river and harbor act of June 25, 1910, between the Hempstead, Red River No. 1, and Long Prairie levee districts in Arkansas, for the purpose of assisting in closing crevasses in their levee lines on upper Red River, caused by high water in the spring of 1915, provided that the levee districts furnished the funds necessary to complete the work.

The Red River levee district No. 1 complied with this condition and deposited \$22,500 to the credit of the Treasurer of the United States to be used with the allotment of \$6,000 from the appropriation in doing the work. The short working season not permitting the delay required for a contract, proposals were invited by circular letter, and the bid of Francis T. Constant, of Alexandria, La., was accepted October 8, 1915, to close a break in the levee at Jackson Place, about 3 miles above Garland, Ark., requiring about 140,000 cubic yards of earthwork at 18.4 cents per cubic yard. Owing to an

unusual rise in the river, construction work was not begun until November 28, 1915. Several additional high-water periods greatly delayed operations, and the breaks in the levee were not completely repaired until June 30, 1916. The total amount of embankment placed was 149,494 cubic yards.

Amount expended during the year and unexpended balance July 1, 1916.

Allotments.	Expenditures during year.	Balance unexpended July 1, 1916.
Maintenance of improvement.....	\$40,848.17	\$21,346.44
Levees.....	6,075.19	8,407.82
Funds contributed by Red River levee district No. 1, for building levee.....	18,549.70	3,950.80
Total.....	65,473.06	33,704.86

APPROPRIATIONS.

Previous projects (H. Doc. 1491, 63d Cong., 3d sess., p. 535)----- \$1,553,877.50

Existing project:

July 13, 1892 (river and harbor act)-----	¹ \$143,298.67	
Aug. 18, 1894 (river and harbor act)-----	² 147,511.01	
June 3, 1896 (river and harbor act)-----	100,000.00	
Mar. 3, 1899 (river and harbor act)-----	150,000.00	
June 13, 1902 (river and harbor act)-----	125,000.00	
Mar. 3, 1905 (river and harbor act)-----	100,000.00	
Mar. 2, 1907 (river and harbor act)-----	150,000.00	
Mar. 3, 1909 (river and harbor act, allotment made Apr. 6, 1909)-----	65,000.00	
June 25, 1910 (river and harbor act)-----	75,000.00	
Feb. 27, 1911 (river and harbor act)-----	20,000.00	
July 25, 1912 (river and harbor act)-----	50,000.00	
Mar. 4, 1913 (river and harbor act)-----	75,000.00	
Oct. 2, 1914 (river and harbor act, allotment made Oct. 7, 1914)-----	30,000.00	
Mar. 4, 1915 (river and harbor act, allotment made Dec. 11, 1915)-----	35,000.00	
July 27, 1916-----	55,000.00	
		1,320,809.68
Total of appropriations-----		2,874,687.18
Receipts from contributed funds-----		22,500.00
Total of United States and contributed funds-----		2,897,187.18
Receipts from sales, refundments, etc-----		10,742.12
Grand total-----		2,907,929.30

COMMERCIAL STATISTICS.

These statistics were compiled for the fiscal instead of the calendar year, because the former more nearly coincides with the commercial year and the period of navigation ordinarily closes in June.

Season of navigation between the mouth and Fulton, Ark., opened July 1, 1915, and closed June 30, 1916.

¹ Not including \$1,701.33 allotted to Cypress Bayou.

² Not including \$2,488.99 allotted to Sulphur River.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Steam.....	4	793
Gasoline.....	1	21
Unregistered:		
Gasoline.....	6	40
Barges.....	10	1,100
Rafts.....		7,330
Total.....	21	9,304

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Cotton.....	3,680 bales.....	1,104	\$276,000	35	1.1
Cotton seed.....	35,115 sacks.....	2,634	105,380	38	0.7
Grain.....	1,931 sacks.....	145	5,800	35	0.6
Provisions.....	70,380 packages.....	2,519	527,850	35	1.7
Hay.....	3,170 bales.....	238	3,808	35	0.8
Cattle.....	440 head.....	176	28,160	35	2.2
Hogs.....	5,248 head.....	525	84,000	35	1.1
Poultry.....	431 coops.....	32	9,600	35	1.9
Hides and skins.....	88 bundles.....	7	3,150	35	1.7
Lime and cement.....	1,790 barrels.....	179	2,685	35	1.1
Sand and gravel.....	3,000 cubic yards.....	4,060	5,062	1	(1)
Lumber.....	262,220 feet b. m.....	656	11,480	35	0.7
Shingles.....	1,650 bundles.....	55	2,475	35	1.3
Staves.....	57,200 pieces.....	1,001	8,008	35	0.6
Timber (rafted).....	2,450,000 feet b. m.....	7,350	18,375	35	(1)
Brick.....	97,000.....	194	776	35	0.7
Fish.....	2,968 barrels.....	371	74,200	100	(1)
Ice.....	238.....	238	1,428	100	(1)
Miscellaneous.....	48,510 packages.....	4,851	727,650	35	2.8
Total.....		27,325	1,895,867		

1 No rate given.

2. OUACHITA AND BLACK RIVERS, ARK. AND LA.

MAINTENANCE.

The U. S. snag boat *Jos. E. Ransdell* was laid up at Alexandria, La., from July 1 to August 31, 1915, as the water in these streams was too high for effective work. Operations were resumed September 1 and were continued without interruption until February 4, 1916. During this period obstructions were removed on both rivers between Camden, Ark., and the mouth of Black River, La., a distance of 350 miles, and portions of the streams were worked over twice. From February 5 to March 10, 1916, the boat was employed in saving life and property endangered by flood water from the Mississippi River, which came through a break in the levee near Point Pleasant, La. The remainder of March the *Ransdell* was engaged in towing material for use in constructing permanent buildings at Lock and Dam No. 8, after which it was laid up at Monroe, La., until the end of the fiscal year, as the water was too high for

work except for a short time in June when it was towing two quarter boats from Alexandria, La., for use on tributaries of Ouachita River. The following summary shows the work performed during the fiscal year:

Snags pulled.....	2, 229
Stumps pulled and destroyed.....	1, 118
Shore snags cut.....	76
People removed from overflow.....	40
Live stock removed from overflow.....	101
Cost per obstruction removed.....	\$2. 53

The U. S. snag boat *C. W. Howell* was employed in Black River from February 25 to March 8, 1916, and transferred 5 families, 39 horses, and 6 cattle from overflowed ground to high land.

The U. S. dredge *Waterway* was also employed in Black River in saving life and property endangered by flood from February 17 to March 8 and transferred 24 people, 964 head of live stock, and some household goods, etc., from the overflowed section to high ground.

The U. S. steam derrick boat *No. 2* was laid up at Calion, Ark., from July 1 to September 17, 1915. Operations began at Calion September 18 and were continued upstream to Camden, Ark., a distance of 53.3 miles, having been suspended January 8, 1916, on account of high water. During the remainder of the fiscal year the boat was laid up at Camden. The following is a summary of the work done during the fiscal year:

Snags pulled and destroyed.....	968
Stumps pulled and destroyed.....	251
Shore snags cut.....	124
Leaning trees cut.....	550
Side jams removed.....	1
Logs removed from channel.....	15
Cost per obstruction removed.....	\$1. 80

CONSTRUCTION OF LOCKS AND DAMS.

LOCK AND DAM NO. 2.

This lock and dam is at Harrisonburg, La. During the fiscal year the Ouachita River remained at a high stage almost continuously, and prevented any construction work under the contract with the Miller Engineering Co. for building the dam at this place. The contractor made preparations for beginning work, procured material, made sheet piles, erected camp buildings, prepared plant, etc., but did nothing under the contract except driving 8 pile clusters above and below the lock, and constructing 264 needles for weir and navigation pass. This contract was about 7 per cent and the lock and dam about 68 per cent completed at the end of the fiscal year. The amount expended during the year was \$10,583.63.

LOCK AND DAM NO. 3.

This lock and dam is located at Call Landing, near Riverton, La. On account of almost continuous high water in Ouachita River, only a small amount of construction work could be done during the fiscal year. Operations, however, were prosecuted, so far as practicable, by hired labor with Government plant, from July 1 to December 21, 1915, after which the force was discharged and the plant laid up.

During this period 491 steel sheet piles were driven in line of piling across the river at the heel of the dam and extended under the lock into the adjacent bank. Seventy-eight round and 602 triple-lap sheet piles were driven in cofferdam closing end of lock chamber and 1,075 cubic yards of puddle fill was placed therein; 79 foundation and 182 sheet piles were driven for the dam abutment and adjacent retaining wall at the right bank, 4,249 cubic yards of material being excavated from the foundation pit for this part of the work, and 182 cubic yards of concrete placed therein. The plant used on the work was repaired when necessary, sheet piling fabricated, material received and stored, foundation piles rafted, and all plant cared for properly. The steel for lock gates was purchased under contract and delivered in January, 1916. At the end of the fiscal year 59 per cent of the piling for the lock had been driven, the second lock cofferdam completed, about half of the lock pit excavated, and the river wall and gate section of the land wall partly built. Only a small amount of work has been done on the dam. The quantities of work and unit costs were as follows:

Statement of work done at Lock and Dam No. 3 during the fiscal year ending June 30, 1916.

Classification.	Unit.	Previous to fiscal year 1915-16.	During fiscal year 1915-16.	Total.	Unit cost. ¹
Cofferdams:					
Lumber in.....	Feet b. m.	148,000	213,000	361,000	\$366.40
Round piling.....	Linear feet.....	1,887	2,380	4,147	.22
Metal in.....	Pounds.....	25,360	4,500	29,860	.06
Puddle fill.....	Cubic yards.....	3,315	1,075	4,390	.30
Concrete.....	.....do.....	3,688	182	3,870	10.63
Excavation.....	.....do.....	8,220	4,249	12,469	.40
Fill:					
Gravel.....	.....do.....	150	.....	150	.....
Earth.....	.....do.....	131	.....	131	.....
Piling:					
Foundation round.....	Linear feet.....	20,330	2,370	22,700	.40
Sheet metal.....	Tons.....	14	375	389	50.90
Sheet wood.....	Feet b. m.	249,000	34,000	283,000	\$49.44

¹ Material, services, and supplies; no overhead charges included. Unit costs for season 1915-16.

² Salvaged lumber: Sheet piles made extra thick account of damaged condition of material.

³ Per 1,000 feet b. m.

The lock and dam is about 35 per cent completed. The amount expended during the fiscal year was \$81,947.01.

LOCK AND DAM NO. 4.

This lock and dam is located at Monroe, La. It had been entirely completed except the water supply and waste drains for the lock master's house prior to the fiscal year. This work, which consisted of 1,350 feet of 2-inch pipe tapping a main of the Monroe water system, three fire plugs, bathroom connections, and 200 feet of sewer, was done by hired labor during July and August, 1915. The amount expended during the fiscal year was \$360.84.

LOCK AND DAM NO. 6.

This lock and dam is located near Roland Raft, about 4 miles from Felsenthal, Ark. Except for the construction of a telephone line, it had been entirely completed prior to the fiscal year. Some prepara-

tions for the erection of this line were made during the year. The amount expended was \$18.50.

LOCK AND DAM NO. 7.

This lock and dam is to be located at Perigeethe Shoals, 82.3 miles below Camden, Ark. Work had been started on the construction camp prior to the fiscal year, but was suspended on account of lack of funds. As no allotment has been made, nothing was done during the year except the care of the buildings and grounds at the lock site. The amount expended for this purpose during the fiscal year was \$1,797.24.

LOCK AND DAM NO. 8.

This lock and dam is located at Franklin Shoals, about 10 miles below Calion, Ark. It had been completed and placed in operation prior to the fiscal year. Construction of permanent buildings by hired labor was begun March 20, 1916, and the lock master's dwelling, needle house, and shop were finished by May 18. This completes the project except for the construction of a telephone line and bank-protection work. The amount expended during the fiscal year was \$4,955.65.

Amount expended during the year and unexpended balance July 1, 1916.

Allotments.	Expenditures during year.	Balance unexpended July 1, 1916
Maintenance of improvement.....	\$19,322.22	\$14,754.32
Lock and Dam No. 2.....	10,583.63	182,310.96
Lock and Dam No. 3.....	81,347.01	86,452.68
Lock and Dam No. 4.....	360.34	
Lock and Dam No. 6.....	13.50	2,470.54
Lock and Dam No. 7.....	1,797.24	2,912.76
Lock and Dam No. 8.....	4,955.65	2,451.10
Total.....	118,380.09	203,383.38

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 8d sess., p. 519)..... \$612,500.00

Existing project:

June 13, 1902 (river and harbor act).....	\$111,500.00
Mar. 3, 1903 (sundry civil act).....	250,000.00
Mar. 3, 1905 (river and harbor act).....	80,000.00
Mar. 3, 1905 (sundry civil act).....	12,000.00
June 30, 1906 (sundry civil act).....	91,954.00
Mar. 2, 1907 (river and harbor act).....	200,780.00
May 27, 1908 (sundry civil act).....	225,000.00
Mar. 3, 1909 (river and harbor act, allotment made Apr. 6, 1909).....	160,000.00
Mar. 4, 1909, sundry civil act.....	40,312.00
	135,823.00
June 25, 1910 (river and harbor act).....	521,000.00
Feb. 27, 1911 (river and harbor act).....	292,000.00
July 25, 1912 (river and harbor act).....	115,000.00
Aug. 24, 1912 (sundry civil act).....	50,000.00
Mar. 4, 1913 (river and harbor act).....	200,000.00

Mar. 4, 1913 (emergency river and harbor act, allotment made Feb. 6, 1914)-----	\$10,000.00
June 23, 1913 (sundry civil act)-----	150,000.00
Oct. 2, 1914 (river and harbor act, allotment made Oct. 7, 1914)-----	320,000.00
Mar. 4, 1915 (river and harbor act, allotment made Apr. 1, 1915)-----	136,000.00
July 27, 1916-----	499,000.00
	<hr/> \$3,600,369.00
Total of appropriations-----	4,212,869.00
Receipts from sales, etc-----	18,754.65
Grand total-----	<hr/> 4,231,623.65

CONTRACTS IN FORCE.

Name of contractor: Miller Engineering Co.
 Character of work: Constructing Dam No. 2, a lock master's dwelling, needle house, storehouse, and shop on Ouachita River at Harrisonburg, La.
 Date of contract: February 26, 1915.
 Date of approval: April 3, 1915.
 Date of beginning work: April 8, 1915.
 Time limit: Dam, 200 working days during which natural conditions permit work inside cofferdam; lock master's dwelling, 90 working days; needle house, 45 working days; storehouse and shop, 30 working days each.
 Percentage of completion: Dam not begun. Lock master's dwelling, needle house, storehouse, and shop completed.
 Contract 7 per cent completed.

Unit prices.

Lock master's dwelling, 1, at \$2,500.	Metal, steel reinforcement, 10,000 pounds, at 5 cents.
Needle house, 1, at \$1,500.	Metal, steel structural, 38,000 pounds, at 12 cents.
Shop, 1, at \$600.	Pavement, concrete, 4,360 square yards, at \$2.70.
Storehouse, 1, at \$600.	Piles, cluster, 3,500 linear feet, at 60 cents.
Concrete, 2,900 cubic yards, at \$11.50.	Piles, foundation, 7,200 linear feet, at \$1.
Excavation, 5,100 cubic yards, at 70 cents.	Timber, lumber in cofferdam, 50,000 feet b. m., at \$60 per 1,000 feet b. m.
Fill, block, 1,200 cubic yards, at \$10.	Timber, cap blocks, 7,800 feet b. m., at \$100 per 1,000 feet b. m.
Fill, earth, 1,800 cubic yards, at 70 cents.	Timber, needles, 18,500 feet b. m., at \$100 per 1,000 feet b. m.
Fill, gravel, 300 cubic yards, at \$1.	Sheathing, 5,000 feet b. m., at \$50 per 1,000 feet b. m.
Fill, riprap, light, 800 tons, at \$7.	Timber, sheet piles, common, 16,400 feet b. m., at \$75 per 1,000 feet b. m.
Gauge, tile, 9 linear feet, at \$5.	Timber, sheet piles, triple lap, 176,500 feet b. m., at \$100 per 1,000 feet b. m.
Metal, chain, coil, 2,350 pounds, at 12 cents.	
Metal, chain, log, 3,250 pounds, at 10 cents.	
Metal, iron castings, 1,200 pounds, at 15 cents.	
Metal, iron, wrought, 12,600 pounds, at 10 cents.	
Metal, steel castings, 10,000 pounds, at 15 cents.	
Metal, steel cover plates, 700 pounds, at 12 cents.	

Name of contractor: Independent Bridge Co.
 Character of work: Furnishing and delivering steel lock gates, valves, Poiree trestles, operating machinery, etc., for Lock and Dam No. 3, Ouachita River, near Riverton, La.
 Amount and cost: About 450,000 pounds of metal at a total cost of \$17,718.
 Date of contract: June 24, 1915.
 Date of approval: July 14, 1915.

Date fixed for commencement: August 11, 1915.

Date fixed for completion: October 1, 1915.

Date of completion: Time limit waived and delivery finally completed January 7, 1916. Final acceptance and complete payment delayed to await erection of material in lock.

Percentage of payment under this contract: 67½.

Name of contractor: Independent Bridge Co.

Character: Supplemental agreement to permit payment of 90 per cent of purchase price of material received under preceding contract, reserving 10 per cent until final acceptance after erection.

Date of contract: June 2, 1916.

Date of approval: June 19, 1916.

Percentage of completion: Payment of 22½ per cent of purchase price made June 30, 1916, leaving 10 per cent unpaid.

COMMERCIAL STATISTICS.

These statistics were compiled for the fiscal instead of the calendar year, because the former more nearly coincides with the commercial year and the period of navigation ordinarily closes in June.

Season of navigation between the mouth and Camden, Ark., opened November 15, 1915, and closed June 12, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Steam.....	6	968
Gasoline.....	3	57
Unregistered:		
Gasoline.....	1	38
Barges.....	7	1,250
Rafts.....		30,667
Total.....	17	32,975

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	Cents.
Cotton.....	4,018 bales.....	1,205	\$301,250	150	1.2
Cotton seed.....	36,063 sacks.....	2,909	116,340	150	.7
Grain.....	2,581 sacks.....	216	8,632	115	1.6
Provisions.....	61,580 packages.....	3,079	461,850	150	1.1
Hay.....	4,070 bales.....	305	4,380	123	2.1
Cattle.....	1,244 head.....	498	79,616	145	4.6
Hogs.....	5,401 head.....	540	86,400	150	1.1
Poultry.....	431 coops.....	32	9,600	164	1.9
Hides and skins.....	88 bundles.....	7	3,150	150	1.1
Lime and cement.....	340 barrels.....	34	610	150	1.1
Sand and gravel.....	6,500 cubic yards.....	8,775	10,969	(¹)	(¹)
Lumber.....	148,510 feet b. m.....	371	6,492	107	.6
Shingles.....	1,660 bundles.....	55	2,475	150	1.2
Staves.....	276,818 pieces.....	4,844	38,754	86	.8
Crossties.....	23,000 pieces.....	1,840	11,040	(¹)	(¹)
Timber (barged).....	9,000,000 feet b. m.....	36,000	72,000	11	2.0
Timber (rafted).....	10,822,507 feet b. m.....	30,667	71,667	(¹)	(¹)
Stave bolts.....	100 cords.....	300	1,120	25	.7
Hickory billets.....	7,000.....	15	1,275	(¹)	(¹)
Brick.....	97,000.....	194	776	166	.7
Heading bolts.....	35 cords.....	105	350	20	1.7
Miscellaneous.....	54,602 packages.....	5,460	819,000	166	2.9
Total.....		97,451	2,108,146		

¹ Not given.

3. OPERATING AND CARE OF LOCKS AND DAMS ON OUACHITA RIVER,
ARK. AND LA.

LOCK AND DAM NO. 4.

This structure is located near Monroe, La. It was properly cared for during the fiscal year, and all repairs necessary to keep the plant in serviceable condition were made. The river fell to a low stage and the dam trestles were raised October 12, 1915, the needles being placed in the navigation pass on the 16th. Part of these needles were removed to pass a slight rise October 18, and they were not replaced until November 3-4. Six small boats were passed through the lock in October. A leak, apparently caused by a low sheet pile, occurred under the dam November 6, 1915, immediately below the concrete seal between the line of steel sheet piling and the heel of the dam. It was closed by depositing about 75 cubic yards of sand, gravel, and cinders in front, and it finally disappeared November 16. The dam was lowered on account of a rise in the river November 18 and remained down until June 30, 1916. Three hundred and forty cubic yards of riprap were deposited below the navigation pass in September and 100 cubic yards of riprap in front of the retaining wall below the dam abutment in November, 1915. All work was done by hired labor with Government plant.

LOCK AND DAM NO. 6.

This structure is located near Roland Raft, Ark. It was properly cared for during the fiscal year, and all repairs necessary to keep the plant in serviceable condition were made. The dam was raised October 10-13, 1915. October 15 a leak developed at the toe of the pass apron about 12 feet from the pass weir pier. The pool level was immediately lowered to a 2-foot head and gravel and sand were deposited upstream from the pass, covering the tops of the sheet piles across the stream at the heel of the dam. The leak disappeared on the 18th, making it reasonably certain that the seepage was along the joints of the sheet piling. The missing needles were not replaced until November 5, on account of a swell in the river. The dam was lowered November 17, 1915, remaining down until June 3, 1916. The dam was raised on the date last named, lowered June 7 to pass a freshet, raised June 21, lowered June 27 to furnish water for floating some Government barges down the river, and raised again June 29, remaining up until end of the fiscal year. Eleven small boats were passed through the lock while the dam was raised. A small levee on the left bank, breached during the high water of 1914-15, was repaired and paved with riprap, September to November, 1915. All work was done by hired labor with Government plant.

LOCK AND DAM NO. 8.

This structure is located at Franklin Shoals, Ark. It was properly cared for during the fiscal year and all repairs necessary to keep the plant in serviceable condition were made. The dam was lowered July 3, 1915, and raised again on the 21st. It was down from August 21 to September 24, was up from the latter date to

November 17, then lowered, and not raised again until May 18, 1916. The dam was up from date last named to June 7, then lowered to pass a freshet, raised again June 21, 1916, and kept up until end of the fiscal year. Two boats passed the lock while the dam was in use. All work was done by hired labor with Government plant.

Summary of expenditures during fiscal year ending June 30, 1916.

Class.	Lock and Dam No. 4.	Lock and Dam No. 6.	Lock and Dam No. 8.	Total.
Superintendence, etc.....	\$348. 71	\$286. 84	\$285. 00	\$920. 55
Services.....	3, 645. 51	3, 252. 02	3, 342. 40	10, 239. 93
Supplies, tools, etc.....	1, 675. 40	443. 90	966. 93	3, 085. 23
Office expenses.....	100. 00	100. 00	100. 00	300. 00
Bank protection.....	377. 66			377. 66
Total.....	6, 147. 28	4, 082. 76	4, 694. 33	14, 924. 37

EXPENDITURES TO JUNE 30, 1916.

Locks and Dams Nos. 6 and 8:	
Fiscal year 1913.....	\$5, 273. 60
Fiscal year 1914.....	20, 110. 29
Locks and Dams Nos. 4, 6, and 8:	
Fiscal year 1915.....	18, 263. 55
Fiscal year 1916.....	14, 924. 37
Total.....	58, 571. 81

COMMERCIAL STATISTICS.

As the pools formed by the dams are not continuous, through traffic was not practicable. The vessels which passed through the locks were, in the general case, small fishing boats and similar craft, which carried no freight. Each pool was used by local sawmills for floating logs and to some extent by other navigation interests, but as these boats and rafts did not pass through the locks the commerce is not reported here, but has been included in the statement of freight traffic in the preceding report.

4. OUACHITA RIVER ABOVE CAMDEN TO ARKADELPHIA, ARK.

No work was done during the fiscal year, as no funds were available.

APPROPRIATIONS.

Previous project: Aug. 11, 1888 (river and harbor act).....	\$9,000
Existing project:	
June 25, 1910 (river and harbor act).....	\$10, 000
Feb. 27, 1911 (river and harbor act).....	7, 500
July 25, 1912 (river and harbor act).....	2, 500
Mar. 4, 1913 (river and harbor act).....	2, 500
Total.....	22, 500
Total.....	31, 500

COMMERCIAL STATISTICS.

There was no commerce reported for this portion of Ouachita River during the fiscal year.

5. SALINE RIVER, ARK.

No work was done during the fiscal year, as the necessary plant was not available.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 548)-----	\$21, 500. 00
Existing project:	
June 25, 1910 (river and harbor act)-----	\$5, 400. 00
July 25, 1912 (river and harbor act)-----	8, 000. 00
Mar. 3, 1905 (emergency river and harbor act, allotment made Mar. 6, 1912)-----	¹ 291. 67
Mar. 4, 1913 (river and harbor act)-----	8, 000. 00
	<u>11, 691. 67</u>
Total-----	83, 191. 67

COMMERCIAL STATISTICS.

These statistics were compiled for the fiscal instead of the calendar year, because the former more nearly coincides with the commercial year and the period of navigation ordinarily closes in June.

Season of navigation between the mouth and Warren, Ark., opened January 1, 1916, and closed May 15, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Unregistered:		
Gasoline.....	1	38
Barges.....	2	2, 250
Rafts.....		300
Total.....	3	2, 578

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Staves.....	128, 570 pieces.....	2, 250	\$18, 000
Timber (barged).....	100, 000 feet b. m.....	300	750
Total.....		2, 550	18, 750

6. BAYOU BARTHOLOMEW, BOEUF RIVER, TENSAS RIVER, AND BAYOU MAÇON, AND BAYOUS D'ARBONNE AND CORNEY, LA. AND ARK.

No work was done during the fiscal year for the improvement of any of these streams, as the hulls of U. S. quarter boats *Nos. 3* and *10* were too rotten for service, and no other plant was available. Rebuilding the hulls of these boats with steel was begun by hired labor at Alexandria, La., in December, 1915, and the old cabins were transferred to the new hulls and repaired. This was finished in February, 1916. The cost of rebuilding *No. 3* was \$1,207.17 and *No. 10*, \$1,154.80. The boats were towed in June to Boeuf River and Bayou Bartholomew, to be ready for work when conditions permit.

¹ Allotment of \$500, of which \$208.83 was returned to the Treasury.

APPROPRIATIONS.

By act of—	Bayou Bartholomew.	Boeuf River.	Tensas River and Bayou Macon.	Bayous D'Arbonne and Corney.	Total.
Mar. 3, 1881.....	\$3,000.00	\$5,000.00	\$3,000.00	.....	\$16,000.00
Aug. 2, 1882.....	5,000.00	5,000.00	.....	.....	10,000.00
July 6, 1884.....	5,000.00	5,000.00	4,000.00	\$5,000.00	19,000.00
Aug. 6, 1886.....	5,000.00	5,000.00	4,000.00	2,000.00	16,000.00
Aug. 11, 1888.....	5,000.00	6,000.00	5,000.00	2,000.00	18,000.00
Sept. 19, 1890.....	5,000.00	5,000.00	5,000.00	2,000.00	17,000.00
July 13, 1892.....	5,000.00	10,000.00	5,000.00	4,000.00	24,000.00
Aug. 18, 1894.....	5,000.00	8,000.00	5,000.00	3,000.00	21,000.00
June 8, 1896.....	4,000.00	6,000.00	5,000.00	.....	15,000.00
Mar. 3, 1899.....	5,000.00	6,000.00	4,000.00	.....	15,000.00
June 13, 1902 (allotments July 26, 1902) ¹	5,000.00	3,500.00	4,000.00	2,500.00	15,000.00
Mar. 3, 1905 (allotments Apr. 7, 1905) ²	5,000.00	900.00	9,500.00	1,600.00	17,000.00
Mar. 2, 1907 (allotments Mar. 20, 1907).....	5,000.00	5,000.00	5,000.00	2,000.00	17,000.00
Mar. 3, 1909 (allotments Apr. 6, 1909).....	4,000.00	4,000.00	5,000.00	2,000.00	15,000.00
June 25, 1910 (allotments July 19, 1910) ³	2,730.78	3,769.22	6,000.00	3,500.00	16,000.00
July 25, 1912 (allotments Sept. 26, 1912).....	3,000.00	3,000.00	3,000.00	3,000.00	12,000.00
Mar. 4, 1913 (allotments Apr. 3, 1913).....	4,000.00	6,000.00	4,000.00	2,000.00	16,000.00
Mar. 4, 1915 (allotment May 29, 1915).....	.....	2,000.00	2,000.00	.....	4,000.00
July 27, 1916.....	4,000.00	3,000.00	.....	3,000.00	10,000.00
Total.....	84,730.78	92,199.22	78,500.00	37,600.00	293,000.00
Receipts from sales.....	.....	27.75	27.75	.....	55.50
Grand total.....	84,730.78	92,199.97	78,527.75	37,600.00	293,055.50

¹ Includes \$1,000 for Little D'Arbonne.² The original allotments of appropriation of June 13, 1902, authorized July 26, 1902, were \$5,000 for Boeuf River, \$2,500 for Tensas River and Bayou Macon. Oct. 23, 1903, a transfer of \$1,500 from Boeuf River to Tensas River and Bayou Macon was authorized.³ The original allotments of appropriation of Mar. 3, 1905, authorized Apr. 7, 1905, were \$5,000 for Boeuf River, \$5,000 for Tensas River and Bayou Macon, and \$2,000 for Bayous D'Arbonne and Corney. Jan. 4 1906, a transfer of \$3,700 from Boeuf River to Tensas River and Bayou Macon was authorized, and Dec. 8, 1906, transfers of \$400 from Boeuf River and \$400 from Bayous D'Arbonne and Corney to Tensas River and Bayou Macon were authorized.⁴ The original allotments of appropriation of June 25, 1910, authorized July 19, 1910, provided \$5,000 for Bayou Bartholomew and \$2,500 for Bayous D'Arbonne and Corney. Dec. 1, 1910, a transfer of \$1,000 from Bayou Bartholomew to Bayous D'Arbonne and Corney was authorized. Dec. 5, 1911, a transfer of \$1,269.22 from Bayou Bartholomew to Boeuf River was authorized.

COMMERCIAL STATISTICS.

These statistics were compiled for the fiscal instead of the calendar year, because the former more nearly coincides with the commercial year and the period of navigation ordinarily closes in June.

BAYOU BARTHOLOMEW, LA. AND ARK.

Season of navigation between the mouth and Wilmot, Ark., opened January 1, 1916, and closed May 30, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered, steam.....	1	(¹)
Unregistered:		
Gasoline.....	1	38
Barges.....	2	(¹) 750
Rafts.....	.....	.....
Total.....	4	788

¹Not given.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.
Timber (barged).....	100,000 feet b. m.....	400	\$800
Timber (rafted).....	250,000 feet b. m.....	750	1,875
Total.....		1,150	2,675

BOEUF RIVER, LA.

Season of navigation between the mouth and Alto, La., opened January 1, 1916, and closed June 30, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered, steam.....	4	551
Unregistered, barges.....	2	250
Total.....	6	801

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Cotton.....	4,791 bales.....	1,437	\$359,250	80	1.5
Cotton seed.....	33,900 sacks.....	2,536	101,434	83	0.7
Provisions.....	2,920 packages.....	146	21,900	86	2.2
Hay.....	300 bales.....	23	360	85	2.3
Poultry.....	58 coops.....	4	1,200	80	2.1
Shingles.....	260 bundles.....	9	390	60	1.8
Staves.....	30,513 pieces.....	534	4,272	80	0.7
Rice.....	1,200 sacks.....	60	3,600	85	2.0
Brick.....	60,000.....	120	480	80	0.6
Miscellaneous.....	5,210 packages.....	521	78,150	85	2.4
Total.....		5,390	571,036		

TENSAS RIVER AND BAYOU MAÇON, LA.

Season of navigation between the mouth and New Light, La., opened January 1 and closed June 30, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Steam.....	1	273
Gasoline.....	1	40
Unregistered: Gasoline.....	3	18
Total.....	5	330

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Cotton.....	309 bales.....	93	\$23,000	60	1.8
Cotton seed.....	11,515 sacks.....	804	34,520	60	1.4
Grain.....	46 sacks.....	3	120	60	(¹)
Provisions.....	406 packages.....	20	3,000	60	6.6
Hay.....	100 bales.....	8	128	90	(¹)
Cattle.....	20 head.....	8	1,280	10	(¹)
Hogs.....	300 head.....	30	4,800	60	3.3
Lime and cement.....	30 sacks.....	1	22	30	6.6
Lumber.....	2,000 feet b. m.....	5	87	.....	.....
Staves.....	1,732 pieces.....	30	242	60	1.9
Timber (rafted).....	450,000 feet b. m.....	1,800	4,500	30	2.6
Total.....		2,802	71,699	.....	.....

¹ No rate given.

BAYOUS D'ARBOISNE AND CORNEY, LA.

Season of navigation between the mouth and Farmerville, La., opened January 1 and closed June 30, 1913.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Steam.....	1	42
Gasoline.....	3	19
Unregistered:		
Gasoline.....	3	87
Barges.....	2	500
Rafts.....	.....	16,287
Total.....	9	16,885

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Cotton.....	1,255 bales.....	377	\$94,126	50	2.6
Cotton seed.....	10,172 sacks.....	710	28,800	47	4.2
Grain.....	2,648 sacks.....	199	7,944	40	2.0
Provisions.....	64,896 packages.....	3,245	486,720	40	2.0
Hay.....	1,686 bales.....	126	2,016	20	(¹)
Cattle.....	4 head.....	2	360	15	(¹)
Hogs.....	120 head.....	12	1,920	15	(¹)
Poultry.....	162 coops.....	12	3,600	15	(¹)
Hides and skins.....	18 bundles.....	2	900	40	2.5
Lime and cement.....	110 barrels.....	11	165	20	10.0
Lumber.....	125,000 feet b. m.....	313	5,469	40	1.3
Shingles.....	500 bundles.....	17	765	40	(¹)
Staves.....	58,548 pieces.....	989	7,916	.....	(¹)
Crossties.....	881 pieces.....	70	420	10	(¹)
Timber (rafted).....	5,429,000 feet b. m.....	16,287	40,717	36	.15
Meal.....	44,438 sacks.....	2,222	88,868	40	5.0
Fertilizer.....	1,507.....	188	22,500	.....	(¹)
Persimmon logs.....	2,463 packages.....	249	37,350	.....	(¹)
Miscellaneous.....					
Total.....		25,031	830,555	.....	.....

¹ No rate given.

7. YAZOO, TALLAHATCHIE, COLDWATER, AND BIG SUNFLOWER RIVERS, TCHULA LAKE, STEELE AND WASHINGTON BAYOUS, AND LAKE WASHINGTON, AND BEAR CREEK, MISS.

(A) YAZOO RIVER.

The U. S. snag-and-dredge boat *Ben Humphreys* began work in this river August 14, 1915, and continued until November 30, when operations were suspended on account of high water. During this period snags, stumps, etc., were removed over the entire length of the river, and dredge cuts were made through the bars at Stronghold, McCormack, Rose Bank, Head Honey Island, and French Bend. As snagging and dredging were performed simultaneously it is not practicable to separate the cost of each work. The following is a summary of operations during the fiscal year:

Snags pulled, 526; stumps pulled, 69; logs removed from channel, 707; side jams removed, 4; cubic yards of material dredged, 15,010.

Wrecks removed: Part of hull of steamboat, name unknown, sunk prior to Civil War at head of Honey Island; and part of coal barge at Yazoo City.

Approximate field cost per obstruction removed, \$4.73.

Approximate field cost per cubic yard dredged, 11 cents.

Except for a short period, when working in other streams, this boat was laid up at Vicksburg, Miss., during the remainder of the fiscal year.

(B) TALLAHATCHIE AND COLDWATER RIVERS.

U. S. derrick boat *No. 116*, with a force of laborers housed and fed on quarter boat *No. 11*, began work August 18, 1915, and continued until December 17, when rising water compelled suspension. During this period obstructions were removed between Marks, on the Coldwater, and the mouth, a distance of 12.8 miles, and on the Tallahatchie River between the mouth of Coldwater and Greenwood, 115 miles. The work accomplished during the fiscal year is shown in the following summary:

Snags pulled and destroyed, 1,191.

Stumps pulled and destroyed, 237.

Shore snags cut, 1,111.

Logs removed and destroyed, 175.

Leaning trees cut, 85.

Side jams removed, 29.

Cost per obstruction removed, \$1.40.

During the remainder of the fiscal year these boats were laid up at Greenwood, Miss.

(C) BIG SUNFLOWER RIVER.

MAINTENANCE.

The U. S. snag boat *Ben Humphreys* was employed from December 20, 1915, to February 3, 1916, in removing obstructions to navigation of this stream between Spanish Fort and Sunflower City, a dis-

tance of 61.9 miles. The following is a summary of the work performed:

Snags pulled, 326.
Stumps pulled, 8.
Logs removed from channel, 12.
Jams removed, 3.
Leaning trees cut, 872.
Cost per obstruction removed, \$1.83.

U. S. derrick boat *No. 1* was towed by the snag boat *Ben Humphreys* from Vicksburg, Miss., to Spanish Fort, on this river, November 11, 1915. The boat was then cordelled upstream to Red Rock, 13.8 miles, removing obstructions found on the way, and began dredging at the latter place November 20. A cut through this shoal was finished by the end of November, and during December the boat was employed in cutting a channel through the bar at head of Little Sunflower River and in removing obstructions in that vicinity. As the work was done simultaneously, it is not practicable to separate the cost of dredging and snagging. The following summary shows what was accomplished during the fiscal year:

Snags pulled	18
Stumps pulled	8
Logs removed from channel	60
Wing dams built	1
Leaning trees cut	1
Cubic yards of material dredged	9, 137
Approximate field cost per obstruction removed	\$1. 72
Approximate field cost per foot of wing dam built	cents 80
Approximate field cost per cubic yard dredged	do 17

During the remainder of the fiscal year this boat was laid up at Vicksburg, Miss.

LOCK AND DAM PROJECT.

This lock and dam is located at Little Callao Landing, 62.9 miles above mouth of the river. Work was continued by hired labor with Government plant from July 1, 1915, to January 31, 1916, when it was suspended on account of rising water. Construction was almost finished at this time, and in February the plant used on the work was dismantled, loaded on barges, and towed to Vicksburg, Miss., where it was thoroughly repaired. The U. S. snag boats *Ben Humphreys* and *Thos. B. Florence* then took the barges in tow and transported them to Ouachita River, Ark. and La., where the machinery and appliances will be used in similar work. Except some bank revetment and a small amount of finishing work, no more construction was done at the lock site during the fiscal year. At the end of the year the lock and dam only required the placing of the decking on the cribwork at the toe of the dam, a small amount of riprap pavement, and the construction of a telephone line from the lock site to Murphy, Miss., to be complete and ready for operation. The following table gives an itemized statement of the work done during the fiscal year:

Statement of work done at Big Sunflower River, Miss., lock and dam during the fiscal year ending June 30, 1916.

Classification.	Unit.	Previous to fiscal year 1915-16.	During fiscal year 1915-16.	Total.	Unit cost (field). ¹
Lumber in cofferdams.....	Feet b. m.....	44,000	124,000	168,000	² \$40.00
Metal in cofferdams.....	Pounds.....	16,310	9,285	25,595	.04
Concrete.....	Cubic yards.....	7,919	3,720	11,639	6.10
Excavation.....	do.....	4,956	2,537	7,493	.33
Fill:					
Earth.....	do.....	2,231	3,305	5,536	.80
Gravel.....	do.....		1,160	1,160	2.21
Riprap.....	do.....		7,286	7,286	2.50
Gauge, tile.....	Linear feet.....	5	34	39	3.00
Metal, placed.....	Pounds.....	12,568	177,726	190,294	.06
Piles:					
Foundation.....	Linear feet.....	33,219	24,005	57,224	.24
Steel sheet.....	Tons (short).....	113	316	429	60.00
Wooden sheet.....	Feet b. m.....	227,000	68,000	295,000	³ \$6.57
Pipe, tile drain.....	Linear feet.....	815		815	
Steel reinforcement.....	Pounds.....	10,119	31,423	41,542	.05
Timber:					
Framed.....	Feet b. m.....	8,000	82,000	90,000	³ \$2.00
Crib.....	do.....		110,000	110,000	³ \$4.00
Other.....	do.....	14,000	8,000	22,000	³ \$4.00
Riprap paving.....	Square yards.....		3,285	3,285	2.20

¹ For fiscal year 1915-16; covers material, services, and supplies; no overhead charges included.

² Per 1,000 feet b. m.

³ \$5 pounds per square foot of wall.

(D) TCHULA LAKE—(E) STEELE AND WASHINGTON BAYOUS AND LAKE WASHINGTON—(F) BEAR CREEK.

No funds were available and no work was done in any of these streams during the fiscal year.

APPROPRIATIONS.

By act of—	Yazoo River.	Tallahatchie and Coldwater Rivers. ^a	Big Sunflower River.	Tchula Lake.	Steele Bayou, etc.	Bear Creek.	Total.
Mar. 3, 1873.....	\$40,000.00						\$40,000.00
Mar. 3, 1875.....	12,000.00						12,000.00
Aug. 14, 1876.....	15,000.00						15,000.00
June 18, 1878.....	25,000.00						25,000.00
Mar. 3, 1879.....	15,000.00	\$13,000.00	\$20,000.00				48,000.00
June 14, 1880.....	12,000.00	13,000.00	8,000.00				33,000.00
Mar. 3, 1881.....	6,000.00	3,000.00	4,000.00	\$3,000.00			16,000.00
Aug. 2, 1882.....	8,000.00	3,000.00	5,000.00	2,500.00			18,500.00
July 5, 1884.....	10,000.00	3,000.00	5,000.00	1,500.00	\$2,500.00		22,000.00
Aug. 5, 1886.....	15,000.00	3,500.00	5,000.00	2,000.00			25,500.00
Aug. 11, 1888.....	32,000.00	5,000.00	5,000.00	3,000.00	2,500.00		47,500.00
Sept. 19, 1890.....	25,000.00	5,000.00	5,000.00	3,000.00	2,500.00		40,500.00
July 13, 1892.....	20,000.00	5,000.00	5,000.00	3,000.00	2,500.00		35,500.00
Aug. 18, 1894.....	20,000.00	4,000.00	5,000.00	3,000.00			32,000.00
June 3, 1896.....	20,000.00	4,000.00	5,000.00				29,000.00
Mar. 3, 1899.....	20,000.00	5,000.00	5,000.00				30,000.00
June 13, 1902 (allotments July 30, 1902).....	21,000.00	10,000.00	20,000.00	4,000.00			55,000.00
Mar. 3, 1905 (allotments Apr. 7, 1905) ^b	78,000.00	10,000.00	13,000.00	4,000.00			105,000.00

^a The original allotments of appropriation of Mar. 3, 1905, authorized Apr. 7, 1905, were \$90,000 for Yazoo River and snag boat and \$5,000 for Tallahatchie and Coldwater Rivers. July 12, 1906, a transfer of \$45,000 from Yazoo River to Tallahatchie and Coldwater Rivers was authorized. A transfer of \$7,000 from Yazoo River to Big Sunflower River was authorized Dec. 23, 1909.

APPROPRIATIONS—Continued.

By act of—	Yazoo River.	Tallahatchie and Coldwater Rivers. ^a	Big Sunflower River.	Tchula Lake.	Steele Bayou, etc.	Bear Creek.	Total.
Mar. 2, 1907 ¹	\$34,500.00	\$10,500.00	\$100,000.00	\$4,000.00	.....	.....	\$149,000.00
Mar. 3, 1909 (allotments Apr. 6, 1909) ²	10,000.00	16,113.27	.....	3,886.73	.....	.....	30,000.00
June 25, 1910 (allotments Aug. 2, 1910) ³	10,778.51	6,221.49	14,000.00	.....	\$5,000.00	\$3,000.00	39,000.00
Feb. 27, 1911 (allotments Mar. 22, 1911).....	.....	8,544.03	865.51	.....	1,549.81	1,540.06	12,500.00
July 25, 1912 (allotments Sept. 6, 1912).....	7,000.00	8,000.00	7,500.00	.....	2,600.00	.....	25,000.00
July 25, 1912.....	.....	.....	75,000.00	.....	.....	.....	75,000.00
Mar. 4, 1913 (allotments Apr. 5, 1913) ⁴	9,000.00	11,000.00	14,524.64	2,083.24	2,500.00	892.12	40,000.00
Mar. 4, 1913.....	.....	.....	120,000.00	.....	.....	.....	120,000.00
Oct. 2, 1914 (allotments Oct. 24, 1914).....	14,000.00	8,000.00	98,000.00	.....	.....	.....	120,000.00
Mar. 4, 1915 (allotment Apr. 2, 1915).....	.....	.....	104,000.00	.....	.....	.....	104,000.00
Mar. 4, 1915 (allotments May 4, 1915).....	5,000.00	5,000.00	5,000.00	.....	.....	.....	15,000.00
July 27, 1915.....	16,000.00	13,000.00	63,000.00	3,000.00	.....	.....	95,000.00
Total.....	500,278.51	172,878.78	711,890.15	41,989.97	24,049.81	5,432.78	1,456,599.00
Receipts from sales.....	1,329.68	131.20	637.39	.....	.....	.....	2,098.27
	501,608.19	173,009.98	712,527.54	41,989.97	24,049.81	5,432.78	1,458,598.27

¹ The river and harbor act of Mar. 2, 1907, made specific appropriation of \$100,000 for Big Sunflower River and \$4,000 for Tallahatchie River above mouth of Coldwater River to Batesville. The following allotments for maintenance were authorized Mar. 20, 1907: Yazoo River, \$35,000; Tallahatchie and Coldwater Rivers, \$5,000; and Tchula Lake, \$4,000. A transfer of \$1,500 from Yazoo River to Tallahatchie and Coldwater Rivers was authorized Dec. 23, 1908.

² The original allotments of appropriation of Mar. 3, 1909, authorized Apr. 5, 1909, provided \$15,000 for Tallahatchie and Coldwater Rivers and \$5,000 for Tchula Lake, but a transfer of \$1,113.27 from the latter to the former was authorized Mar. 22, 1911.

³ The original allotments of appropriation of June 25, 1910, authorized Aug. 2, 1910, provided \$16,000 for Yazoo River, \$5,000 for Tallahatchie and Coldwater Rivers, and \$10,000 for Big Sunflower River. A transfer of \$1,221.49 from Yazoo River to Tallahatchie and Coldwater Rivers was authorized Mar. 22, 1911, and a transfer of \$4,000 from Yazoo River to Big Sunflower River was authorized Dec. 5, 1911.

⁴ The original allotment of appropriation of Mar. 4, 1913, authorized Apr. 5, 1913, provided \$13,000 for Big Sunflower River, \$2,500 for Tchula Lake, and \$2,000 for Bear Creek. A transfer of \$416.73 from Tchula Lake and \$1,107.88 from Bear Creek to Big Sunflower River was authorized Feb. 12, 1914.

^a Appropriations of \$19,000 are included for Tallahatchie River from mouth of Coldwater River to Batesville. This portion of the river is not part of the project.

COMMERCIAL STATISTICS.

These statistics were compiled for the fiscal instead of the calendar year, because the former more nearly coincides with the commercial year, and the period of navigation ordinarily closes in June.

(A) YAZOO RIVER.

Season of navigation between the mouth and Greenwood, Miss., opened July 1, 1915, and closed June 30, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Steam.....	6	368
Gasoline.....	5	61
Unregistered:		
Barges.....	12	2,000
Rafts.....	.....	36,718
Total.....	23	39,147

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Cotton.....	9,000 bales.....	2,700	\$670,000	125	2.6
Cotton seed.....	65,642 sacks.....	4,771	190,800	120	1.6
Grain.....	12,160 sacks.....	912	36,480	125	1.5
Provisions.....	940 packages.....	47	7,050	100	2.2
Hay.....	4,773 bales.....	358	5,725	120	2.2
Cattle.....	588 head.....	227	36,320	105	4.0
Hogs.....	320 head.....	82	5,120	105	4.0
Hides and skins.....	183 bundles.....	14	6,165	75	2.6
Sand and gravel.....	2,052 cubic yards.....	2,770	3,482	40	(1)
Lumber.....	371,112 feet b. m.....	928	16,240	95	1.6
Croasties.....	3,000 pieces.....	240	1,440	40	2.9
Timber (barged).....	5,334,748 feet b. m.....	21,339	42,672	50	1.3
Timber (rafted).....	12,229,400 feet b. m.....	36,718	91,795	25	.2
Stave bolts.....	12 cords.....	36	260	15	(1)
Miscellaneous.....	138,907 packages.....	13,766	2,064,905	125	1.6
Total.....		84,858	3,183,603		

¹ Not given.

(B) TALLAHATCHIE AND COLDWATER RIVERS.

Season of navigation between the mouth and Minter City, Miss., opened July 1, 1915, and closed June 30, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered, steam.....	1	99
Unregistered:		
Gasoline.....	5	9
Barges.....	4	300
Rafts.....		35,400
Total.....	10	35,808

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Cotton.....	15,007 bales.....	4,787	\$1,196,800	45	2.2
Cotton seed.....	161,335 sacks.....	12,100	484,000	45	2.6
Grain.....	15,600 sacks.....	1,170	46,800	45	4.4
Provisions.....	33,520 packages.....	1,690	253,500	45	5.5
Hay.....	26,848 bales.....	2,013	32,208	45	10.0
Cattle.....	250 head.....	100	16,000	45	7.6
Hogs.....	500 head.....	50	8,000	45	8.4
Hides and skins.....	1,500 bundles.....	112	50,625	45	12.2
Lime and cement.....	1,000 barrels.....	100	1,500	45	8.5
Lumber.....	127,000 feet b. m.....	317	5,556	45	4.0
Staves.....	91,428 pieces.....	1,600	128,000	45	(1)
Timber (rafted).....	11,800,000 feet b. m.....	35,400	88,500	45	(1)
Total.....		59,439	2,311,489		

¹ Not given.

(C) BIG SUNFLOWER RIVER.

Season of navigation between the mouth and Woodburn, Miss., opened July 1, 1915, and closed June 30, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Steam.....	3	117
Gasoline.....	5	61
Barges.....	2	400
Unregistered:		
Barges.....	8	.....
Rafts.....		60
Total.....	18	638

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	Cents.
Cotton.....	2,587 bales.....	776	\$194,100	110	3.0
Cotton seed.....	29,279 sacks.....	2,199	87,988	110	1.3
Grain.....	3,550 sacks.....	266	10,640	110	2.5
Provisions.....	1,560 packages.....	78	11,700	110	2.1
Hay.....	4,071 bales.....	306	4,880	65	2.5
Cattle.....	418 head.....	167	26,720	96	2.4
Hogs.....	220 head.....	22	3,520	57	4.1
Hides and skins.....	133 bundles.....	10	4,500	125	2.6
Sand and gravel.....	100 cubic yards.....	270	337	40	(1)
Lumber.....	428,141 feet b. m.....	1,073	18,767	105	1.0
Shingles.....	12 bundles.....		18		5.0
Timber (barged).....	10,973,442 feet b. m.....	43,894	87,788	105	1.1
Timber (rafted).....	20,000 feet b. m.....	60	150	125	1.3
Miscellaneous.....	82,905 packages.....	8,290	1,243,575	.....	2.1
Total.....		57,410	1,694,683		

¹ No rate given.

(D) TCHULA LAKE.

Season of navigation through the lake opened December 15, 1915, and closed June 30, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Unregistered, gasoline.....	1	5

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.
				<i>Miles.</i>
Cotton.....	101 bales.....	30	\$7,500	10
Cotton seed.....	7,500 sacks.....	562	22,500	10
Provisions.....	500 packages.....	25	3,750	10
Hay.....	700 bales.....	52	840	10
Lumber.....	30,000 feet b. m.....	75	1,312	10
Total.....		744	\$5,902	

(E) STEELE AND WASHINGTON BAYOUS AND LAKE WASHINGTON.

Season of navigation between the mouth and Glen Allen, Miss., opened December 15, 1915, and closed June 30, 1916.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered:		
Steam.....	1	46
Gasoline.....	1	9
Unregistered:		
Gasoline.....	2	4
Barges.....	3	450
Rafts.....		744
Total.....	7	1,253

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Cotton seed.....	4,000 sacks.....	300	\$12,000	14	10.7
Grain.....	6,000 sacks.....	450	18,000	14	(1)
Provisions.....	1,000 packages.....	50	7,500	14	(1)
Lumber.....	50,000 feet b. m.....	125	2,187	14	(1)
Timber (barged).....	154,225 feet b. m.....	617	1,234	50	1.5
Timber (rafted).....	248,000 feet b. m.....	744	1,880	75	1.5
Total.....		2,286	42,781		

¹ No rate given.

(F) BEAR CREEK.

There was no commerce reported for this stream during the fiscal year.

IMPROVEMENT OF RIVERS AND HARBORS IN THE LITTLE ROCK,
ARK., DISTRICT.

REPORT OF MAJ. E. J. DENT, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Arkansas River, Ark. and Okla.	2559	5. Cache River, Ark.	2573
2. White River, Ark.	2566	6. Black and Current Rivers, Ark.	
3. White River at Devall Bluff, Ark.	2569	and Mo.	2574
4. Operating and care of Locks and Dams Nos. 1, 2, and 3, Upper White River, Ark.	2569	7. St. Francis and L'Anguille Rivers and Blackfish Bayou, Ark.	2577

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1055 TO 1084.

1. ARKANSAS RIVER, ARK. AND OKLA.

Except for the hire of a steamboat used as a dredge tender, and of barges used in repair of revetment at Pine Bluff all operations and expenditures under this project during the fiscal year were by hired labor with Government plant.

Snagging operations.—The expenditures during the year were \$26,553.26.

The snag boat *Arkansas* (lying at Little Rock at the beginning of the year) began operations at that place July 14, 1915, working up to Lawsons, 28 miles above Little Rock and 202 miles above the mouth of the river, thence to Pine Bluff, 107 miles above the mouth, where it lay to from August 21 to September 2, because of a passing freshet. It then worked over the section of the river between New Gascony, 90 miles above the mouth, and Wild Cat Bend, 135 miles above the mouth, until September 20 when it again lay to because of another freshet. It resumed operations October 3, between which date and the close of operations on January 14, 1916, it worked over the river between Wild Cat Bend and Poverty Point, 8 miles above the mouth. After the close of the snagging operations, the boat was used in connection with surveys in the Pine Bluff reach until March 13, when it was run to Little Rock and annual repairs made. The principal repairs were new master wheels and worms to the capstans, new ash pan for the auxiliary boiler, new coils in feed water heaters, one new section in exhaust lines, new canvas on boiler deck, hold scraped and painted, hull painted above water line, and upper works painted. At the close of this fiscal year it is in ordinary at Little Rock.

The snag boat *C. B. Reese* (working in White River at the beginning of the fiscal year) came into the Arkansas River July 28, 1915, working between Poverty Point (8 miles above the mouth of the river) and New Gascony (90 miles above the mouth of the river) until November 30, when it returned to White River. The Board of Engineers for Rivers and Harbors, traveling on board the *C. B. Reese*, inspected the river from its mouth to New Gascony on November 12-15, 1915. It reentered the Arkansas River January 10, 1916, working between the Memphis, Helena & Louisiana Railway bridge, 19 miles above the mouth, and Pendleton, 42 miles above the mouth, until January 21, 1916, when the boat was taken to the marine ways at West Memphis for repair to bottom plating. It was not placed on the ways until March 8, on account of continued flood stages in the Mississippi River. It was returned to the water April 6, after which the boat was held at West Memphis, where repairs to machinery were made. The principal repairs made were: Nine plates, aggregating 2,624 pounds were used in replacing defective ones in the bottom of the hull; the hull was sand blasted on the outside and painted with pitch; the capstan machinery dismantled, and new keys and bushings filled where needed, and then reassembled; the three rudders were strengthened by the addition of doubling plates alongside the stocks through the blades; the center rudder was shortened 3 inches, it having had 3 inches more draft than the hull; new ash pan for the auxiliary boiler, and new stacks were placed; new paddle wheel built; hold oiled on bottom, and painted on sides and bulkheads; upper works, including roof, repainted; electric lighting equipment overhauled completely, with new wiring throughout. The *C. B. Reese* is lying at West Memphis at the close of this fiscal year.

Summary of snagging operations in Arkansas River, fiscal year 1916.

Date.	Boat.	Work done between—	Distance.	Snags removed.	Trees cut.	Drifts broken.	Miles run.
			<i>Miles.</i>				
July 1915.	Arkansas.....	Pawpaw Cutoff and Lawsons..	55	92	1,908	3	124
	C. B. Reese.....	Poverty Point and Red Fork..	17	22	4	1	19
August.....	Arkansas.....	Pine Bluff and Little Rock 1..	67	66	760	2	132
	C. B. Reese.....	Poverty Point and Hanna-berry.	61	92	3,222	3	246
September.....	Arkansas.....	New Gascony and Wild Cat Landing.	46	65	882	.....	118
	C. B. Reese.....	Almonds Bend and Bickers Bend.	30	94	4,662	.....	46
October.....	Arkansas.....	Arkansas Post and Wild Cat Landing.	99	65	3,092	.....	249
	C. B. Reese.....	Poverty Point and Dyes.....	65	92	3,594	.....	185
November.....	Arkansas.....	Pendleton and Adamsburg.....	85	180	1,191	.....	160
	C. B. Reese.....	Poverty Point and New Gascony.	82	145	635	2	238
December.....	Arkansas.....	Poverty Point and Upper Reydell.	50	94	2,830	.....	248
1916.							
January.....	Arkansas.....	Poverty Point and Ste. Marles Bend.	93	2	1,167	.....	123
	C. B. Reese.....	Memphis, Helena & Louisiana Railway bridge and Pendleton.	23	2	1,585	.....	64
	Total....	Poverty Point and Lawsons...	194	1,011	25,527	11	2,682

¹ Also destroyed wreck of Cora L. Roberts in Waterworks Bend, near Little Rock.

Maintenance of works at Pine Bluff.—The expenditures during the year were all for maintenance of the revetment along the town front, and were \$58,604.24 for hired labor and materials and \$2,308.59 for rental of barges; total, \$60,912.83.

The flood which crested at 26.9 feet on Pine Bluff gauge on June 2, 1915, damaged the revetment. A second wave of this flood crested at 25.6 feet on Pine Bluff gauge July 2, 1915, and it was not until the first week of August that a close examination of the work could be made. This examination showed the mattress from Ohio Street to 600 feet above Lone Tree Point (about 3,300 feet) and the bank slope below 18-foot stage Pine Bluff gauge from near Nebraska Street to 2,600 feet downstream badly broken. On August 16 a mattress 100 feet wide was started at Nebraska Street, but a freshet stopped this work when only 55 feet had been woven. As a protection to the bank slope in that vicinity during the then pending freshet, a mattress 48 feet wide by 311 feet long was sunk on the bank slope. This freshet culminated at 24.8 feet on Pine Bluff gauge on August 25. On September 7 a mattress 100 feet wide was begun at Ohio Street. This was continued downstream 874 feet, when, on September 20, it was ended and sunk because of another freshet, which culminated at 20.8 feet on Pine Bluff gauge September 23. River stages still remaining too high for repairing the lower bank slopes, a mattress 80 feet wide was begun at a point 500 feet downstream from Nebraska Street on October 8. This width continued for 1,138 feet, when the mattress was narrowed to 60 feet and 982 linear feet of that width woven, making the total length of this footing mattress 2,120 feet. A mattress 40 feet wide by 118 feet long was then placed at the foot of the bank slope near the old railway trestle and one 70 feet wide by 338 feet long was placed in the old Ohio Street eddy, both of these being in the nature of temporary reinforcements. On November 10 a mattress 140 feet wide was begun midway between Kentucky and Florida Streets, this to be the permanent repair from that point downstream. This mattress was continued 4,091 feet, ending 3,067 feet downstream from the east side of Nebraska Street on January 16, 1916. Following this a mattress 65 feet wide extending into the river 107 feet was placed in the old Ohio Street eddy January 21. A second mattress was started here, but when 50 feet had been woven work was stopped by high water, January 22. This rise continued to increase until on February 3, 1916, it equaled the record flood of May 22, 1892, that flood and this one both being 29.6 feet on the gauge.

The flood of February, 1916, eroded the end of Boyds Point, opposite Pine Bluff, for a distance of 630 feet; destroyed the revetment on the Pine Bluff front from midway between Pennsylvania and Ohio Streets to a point 1,500 feet downstream; caused a break in the bank slope 100 feet long, just above Pennsylvania Street; caused a slip in the bank paving between Indiana and Kentucky Streets; and produced excessive scour all along the revetment below Indiana Street. February 15–24 a mattress 65 feet wide by 478 feet long was placed from 150 feet upstream from Pennsylvania Street to the Ohio Street Point, and three pocket mattresses 35 feet by 65 feet each and one 50 by 65 feet were placed in breaks of the bank slope in the vicinity of Pennsylvania Street. February 29–March 3

a pocket mattress 65 feet wide by 108 feet long was placed just below Ohio Street Point. March 3-24 a mattress 65 feet wide by 1,556 feet long was placed from Ohio Street Point to the railway trestle at the downstream end of the broken revetment. March 27 and 28 one small pocket mattress was placed near the railway trestle and one 65 by 125 feet at the Ohio Street Point. April 12-May 9 a mattress 140 feet wide by 1,493 feet long was placed from just below Ohio Street Point to the lower end of the broken revetment. May 10-June 1 a mattress 140 feet wide by 1,343 feet long was placed from midway between Indiana and Kentucky Streets to 40 feet below the Ohio Street Point. June 1-4 a mattress 60 feet wide and extending 125 feet out into river was placed just above Nebraska Street, where seep water had developed a slip. Between February 15 and June 5 the bank from the Ohio Street Point to near the railway trestle, 1,500 linear feet, was graded and paved above the 8.5-foot stage, Pine Bluff gauge. Operations were suspended June 5 because of rising river, and at the close of the year the river is still too high for resumption of mattress work. A map of the locality, with hydrograph of river stages at Pine Bluff, is herewith.

Dredging operations.—The expenditures during the year were:

Completing the construction of 2 pile sinkers.....	\$11, 222. 44
Charter of steamboat as dredge tender.....	5, 364. 50
Operation and care of 2 dredges.....	65, 062. 12
Total.....	81, 649. 06

The two pile sinkers under construction at the beginning of the year were completed and delivered to the dredges September 28, 1915.

The dredges *H. S. Taber* and *Robert McGregor* were lying at Pine Bluff at the beginning of the fiscal year. They moved down to Bickers, 56 miles above the mouth of the river, on July 18, 1915, to begin operations in that vicinity as soon as the river should have fallen to suitable stage. They lay to in that vicinity until on October 13, when the *H. S. Taber* began operations at Cummins (69 miles above the mouth), and on October 14 the *Robert McGregor* began operations at Bickers. There was no continuity of operations because of continually recurring freshets, and the river was at or above medium stage throughout the dredging season. On December 30 the *Robert McGregor* shut down after the completion of work at Jenkins Crossing (105 miles above the mouth). On December 31 the *H. S. Taber* shut down after the completion of work at Wilkins Crossing (99 miles above the mouth). The distribution of the plant time for the two dredges is:

	Days.
Lying at Pine Bluff or in lower river awaiting dredging period (July 1-Oct. 12).....	208
Dredging operations (Oct. 13-Dec. 31).....	160
En route to and lying at Devall Bluff from end of dredging period to end of fiscal year (Jan. 1-June 30).....	364
Total for both dredges.....	732

Of the 45 shoals between Pine Bluff and the mouth of the river on which a depth of 4 feet or less generally obtains whenever both the Arkansas and Mississippi Rivers are at low stage only 12 were dredged this year. Details of the dredging operations and comparison of river stages are given in the following tabulation:

Summary of dredging operations, Oct. 13-Dec. 31, 1915.

Locality.	Miles from mouth.	Dredge.	Arrived.	Departed.	Elapsed time.	Pumping time.	Length dredged.	Width dredged.	Depths referred to mean low water of fiscal year 1916.			Condition at end of 21 day period.
									Before dredging.	1 day after dredging.	21 days after dredging.	
Bickers.....	56	Robert McGregor.	1915. Oct. 14	1915. Oct. 16	Hours. 50	Hours. 26	Feet. 900	Feet. 80	Feet. 8.5	Feet. 10.0	Feet. 6.4	Dredged cut filled and channel 150 feet to right.
Cummins.....	69	H. S. Taber.....	Oct. 13	Oct. 19	144	68	1,800	100	2.8	10.4	7.5	Good.
Heckatoo.....	70	Robert McGregor.	Oct. 16	....do....	72	7	875	40	8.0	.....	9.4	Upper half-length of dredge cut filled and channel 100 feet to right.
Williamette.....	72	....do....	Nov. 6	Nov. 22	390	68	2,150	120	7.0	7.8	11.0	Good.
Bankhead.....	75	....do....	Nov. 23	Dec. 10	410	108	3,745	100	6.0	10.0	9.0	Lower half-length of dredge cut filled and channel 250 feet to left.
Richland.....	87	H. S. Taber.....	Oct. 29	Nov. 17	479	134	3,650	100	3.7	7.0	8.0	Good.
Upper Madding.....	94	....do....	Nov. 18	Dec. 8	480	93	3,650	100	6.0	7.5	8.0	Lower one-third length of dredge cut filled and channel 150 feet to right.
Knotts Island.....	95	....do....	Dec. 8	Dec. 16	184	65	2,770	100	6.7	11.3	11.7	Upper two-thirds length of cut filled and channel 400 feet to left.
Greenfield.....	97	....do....	Dec. 16	Dec. 21	118	99	1,500	100	5.5	10.0	11.7	Good.
Wilkins.....	99	....do....	Dec. 21	Dec. 31	379	60	3,730	100	10.0	8.1	3.9	Cut filled and channel runs diagonally across it from left to right.
Ste. Maries.....	102	Robert McGregor.	Dec. 11	Dec. 27	383	80	3,050	100	7.1	7.2	5.2	Dredge cut filled completely and channel 200 to 400 feet to right.
Jenkins.....	105	....do....	Dec. 27	Dec. 30	74	26	1,200	100	6.5	11.0	.....	No survey at end of 21-day period because of high water.
Awaiting suitable stage, at unassigned localities.	.....	Both dredges.....	.....	.....	677	.....	.....	.....	.....	.....	.....	.....
Total for dredging period.	.....	.....	Oct. 13	Dec. 31	3,540	834	29,020	.....	.....	.....	.....	.....

Comparison of river discharge and gauge heights of fiscal years 1915 and 1916.

	At Little Rock.			At Pine Bluff.		At mouth of river.	
	Month.	Dis-charge.	Gauge heights.	Month.	Gauge heights.	Month.	Gauge heights.
Means for month of lowest water:		<i>Sec. ft.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
1915.....	Nov., 1914.....	3,395	0.4	Nov., 1914.....	4.0	Nov., 1914.....	10.2
1916.....	Nov., 1915.....	14,735	5.5	Nov., 1915.....	9.6	Nov., 1915.....	22.8
Means for continuous period of 15 days of lowest water:							
1915.....	Nov. 19-Dec. 3.	2,385	-0.3	Nov. 19-Dec. 3, 1914.	3.3	Nov. 23-Dec. 7.	7.1
1916.....	Dec. 4-18, 1915.	11,600	4.7	Dec. 5-19, 1915....	9.0	Nov. 7-21, 1915.	18.6
Absolute lowest for one or more days:							
1915.....	Dec. 2-3, 1914....	2,250	-0.4	Nov. 25-26 and Dec. 2, 1914.	3.2	Dec. 2, 1914.....	6.7
1916.....	Dec. 12, 1915....	9,125	3.8	Dec. 12-14 and 16, 1915.	8.2	Nov. 14, 1915....	17.3

Controlling navigation depth between Pine Bluff and mouth of river during the last half of the calendar year 1915.

Dates.	Pine Bluff gauge varying between—	Gauge at mouth of river varying between—	Navigation depth.
1915.	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
July 17-31.....	14.4-11.9	41.4-41.7	4.5
Aug. 12.....	11.2	37.0	6.0
Sept. 13.....	10.5	44.7	4.0
Oct. 9-19.....	12.5-10.0	32.2-32.0	3.0
Nov. 7-15.....	9.2-8.7	20.9-17.3	3.0
Dec. 8-15.....	9.1-8.4	30.5-24.2	3.5

APPROPRIATIONS.

Previous projects: July 3, 1832, to September 15, 1900 (see H.

Doc. No. 1491, 63d Cong., 3d sess., pp. 399-400, and A. R. for 1908, p. 1590) \$2,250,783.46

Existing project:

June 13, 1902, continuing improvement and maintenance and operating snag boats..... \$110,000.00

Apr. 28, 1904—

Allotment, June 7, 1904..... \$20,000.00

Allotment, Feb. 18, 1905..... 501.41

Total 20,501.41

¹ Many of the early appropriations for this river were combined with those of other rivers, and it is impracticable to make an exact statement of the distribution of the appropriations to this river from the lists given in House Document No. 1491, Sixty-third Congress, third session. In the Annual Report for 1908 (p. 1590) there is given a list showing a close approximation to all appropriations and allotments for this river, and this list was used in preparing the list herewith.

² Allotment of \$1,000, of which \$498.59 was returned to the Treasury.

Existing project—Continued.

Mar. 3, 1905—

Maintenance of improvement..... \$35,000.00

Revetment at Red Fork if re-
quired in interest of naviga-
tion..... 30,000.00

Total..... \$65,000.00

Emergency allotment for Pine Bluff, Dec.
21, 1908..... 10,000.00

Mar. 2, 1907—

Maintenance of improvement..... 35,000.00

Arkansas River at Pine Bluff and White
River at Augusta Narrows (part ap-
plied to Pine Bluff)..... 74,200.00Emergency allotment for Pine Bluff, Dec.
21, 1908..... 17,957.00

Mar. 3, 1909—

Preservation and maintenance (general)..... 35,000.00

Works at Pine Bluff..... 97,200.00

Emergency allotment for Pine Bluff, June
20, 1912..... 17,144.82

June 25, 1910—

Maintenance of improvement, including
works at Pine Bluff..... 51,000.00Construction and operation of dredge
boats..... 375,000.00Feb. 27, 1911, maintenance, including works at
Pine Bluff and operation of dredges..... 62,500.00

July 25, 1912—

Maintenance, including works at Pine
Bluff and operation of dredges..... 30,000.00Protection of bank in front of Crawford
County levee..... 30,000.00

Mar. 4, 1913—

Maintenance, including works at Pine
Bluff and operation of dredges..... 48,000.00Protection of bank in front of Crawford
County levee (completion)..... 30,000.00Oct. 2, 1914, allotment, maintenance, including
works at Pine Bluff..... 46,000.00Mar. 4, 1915, allotment, maintenance, including
works at Pine Bluff and operation of dredges..... 259,350.00

July 27, 1916..... 234,700.00

\$1,638,553.23

Total of appropriations and allotments..... 3,889,336.69

Receipts from sales, fiscal years 1907-1915..... 3,765.49

Receipts from sales, etc., fiscal year 1916..... 750.06

Grand total..... 3,893,852.24

COMMERCIAL STATISTICS.

Calendar year 1915.—Save the one trip of a boat through to Fort Gibson and return to Little Rock, no navigation was reported above Carden Bottom, 69 miles above Little Rock and 243 miles above the mouth of the river.

¹Allotment of \$10,000, of which \$2,043 was returned to the Treasury.

²Allotment of \$25,000, of which \$7,855.18 was returned to the Treasury.

Navigation periods for boats of 3-foot draft.

Vicinity of—	Opened.	Closed.
Fort Smith.....	1915. Feb. 1 Feb. 20 Nov. 25 Dec. 15	1915. Feb. 7 Nov. 5 Dec. 3 Dec. 25
Little Rock.....	Feb. 1 Nov. 13 Nov. 25 Dec. 16	Nov. 3 Nov. 20 Dec. 6
Swan Lake.....	Feb. 1 Nov. 25 Dec. 18	Jan. 5 Nov. 3 Dec. 6

Vessel classification.

Class.	Number.	Net registered tons.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	5	576	540
Motor boats.....	6	76	2
Unregistered, barges (towed).....	16	.....	.....

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value (estimated).	Average haul.
				<i>Miles.</i>
Brick.....	20,800	67	\$288	84
Brush (bridge work).....	2,230 cords	4,560	9,120	2
Cotton.....	6,372 bales	1,693	218,600	68
Cotton seed.....	67,620 sacks	3,356	100,680	20
Coal.....	1,200	1,200	4,200	20
Corn.....	3,100 bushels	87	2,349	130
Groceries.....	88	88	15,400	24
Hay.....	16,020 bales	534	8,200	51
Horses.....	164 head	82	16,400	81
Logs.....	4,957,949 feet log scale	20,713	41,426	27
Lumber.....	317,500 feet b. m.	635	8,810	48
Merchandise.....	2,759	2,759	206,925	89
Oats.....	51,786 bushels	622	32,880	28
Rice.....	28,336 bushels	644	17,710	35
Shingles.....	360,000	60	3,900	28
Stave bolts.....	980 cords	2,550	5,100	30
Miscellaneous.....	216	216	13,800	68
Total.....		30,966	300,868	41

2. WHITE RIVER, ARK.

All operations were for maintenance by hired labor with Government plant. The expenditures were:

For completing rebuilding of snag boat <i>Quapaw</i> (part borne by this appropriation).....	\$2,858.37
For snagging operations and maintenance of snag boats.....	12,614.96
Total.....	15,473.35

The snag boat *C. B. Reese* was working in the vicinity of Buck Landing, 134 miles above the mouth of river, at the beginning of the year. It left this river on July 28, 1915, going into the Arkansas River, from which it returned December 1. It then worked in this river below Augusta until January 9, 1916, when it again entered the Arkansas River. At the end of the year the *C. B. Reese* is in ordinary at West Memphis, Tenn.

The snag boat *Quapaw* was rebuilding at Batesville at the beginning of the year. The new hull was completed and the upper works from the old hull transferred to it, as was the old machinery excepting the boilers, new boilers, stacks, and casing being placed. The boat began snagging operations below Lock No. 1, 301 miles above the mouth of the river, September 15, 1915. It went into Black River November 1, from whence it returned December 21. It worked in the upper river until January 17, 1916, when it was run to and laid up at Devall Bluff. In addition to the snagging operations, this boat on September 23-26 towed the pile sinkers for the Arkansas River dredges from Blue Wing Shoal, 274 miles above the mouth of the river, to Poverty Point, 8 miles above the mouth. The *Quapaw* is at Devall Bluff in ordinary at the close of the year. The *A. D. Allen* was used as a relief boat during the floods of August, 1915, and January-February, 1916, between Batesville and the mouth of Black River, and the *Quapaw* was used in similar relief work in the vicinity of Clarendon, Ark., during the February, 1916, flood.

Summary of snagging operations in White River this fiscal year.

Boat.	Work done between—	Distance.	Snags removed.	Stumps removed.	Drifts broken.	Trees cut.	Trees girdled.	Miles run.
		Miles.						
<i>C. B. Reese</i> ...	Mouth and Augusta.....	203	225	.....	25	2,748	15	605
<i>Quapaw</i>	Mouth and Lock No. 1....	301	330	9	1	492	.....	693
Total..	.....	.....	555	9	26	3,240	15	1,298

APPROPRIATIONS.

Appropriations for White River have been partly for limited reaches, partly for the whole river, and partly for it in combination with other rivers. The appropriations specifically for this river are as follows:

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 577) - \$366,000.00

Existing project:

Mar. 3, 1899, open-channel improvement below Batesville.....	\$14,815.00
Maintenance below Batesville—	
June 13, 1902.....	22,000.00
June 13, 1902, emergency allotment, May 31, 1904.....	7,100.00
Mar. 3, 1905.....	15,000.00
Mar. 2, 1907.....	30,000.00
Mar. 2, 1907, Arkansas River at Pine Bluff and White River at Augusta Narrows (part applied to White River).....	25,800.00
Maintenance below Batesville—	
Mar. 3, 1909 (allotment).....	16,000.00
June 25, 1910.....	17,500.00
Feb. 27, 1911.....	18,000.00

Existing project—Continued.

Maintenance below Batesville—Continued.

July 25, 1912-----	\$18,000.00	
Mar. 4, 1913-----	20,000.00	
Oct. 2, 1914 (allotment)-----	10,000.00	
Mar. 4, 1915 (allotment)-----	14,000.00	
July 27, 1916-----	30,500.00	
		\$258,715.00
Total of appropriations and allotments-----		624,715.00
Received from sales, etc., fiscal years 1907-1915-----		381.24
Received from sales, etc., fiscal year 1916-----		181.80
Grand total-----		625,278.04

COMMERCIAL STATISTICS.

Season of navigation calendar year 1915.—The river was navigable all the year to Jacksonport (264 miles above the mouth) by boats of not over 4 feet draft. Between Jacksonport and Batesville, 88 miles, the navigation periods for boats of 2 feet draft were as follows: Open at the beginning of the year; closed July 23; opened August 19, and remained open to close of year.

Vessel classification.

Class.	Number.	Net registered tons.	Passengers.
AMERICAN.			
Registered:			
Steamers.....	12	917	1,069
Motor boats.....	11	149	
Unregistered:			
Motor boats.....	6		
Barges (towed).....	39		
Total.....	68	1,066	1,069

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value (estimated).	Average haul.
				<i>Miles.</i>
Bauxite.....		14,420	\$61,285	125
Cattle.....	564 head.....	188	16,040	43
Coal.....		856	3,210	108
Corn.....	4,500 bushels.....	125	3,375	15
Cotton.....	640 bales.....	160	32,000	84
Cotton seed.....	3,260 sacks.....	163	2,445	7
Excelsior bolts.....	68 ranks.....	115	280	19
Fish.....		100	4,000	50
Gravel and sand.....	4,950 cubic yards.....	7,424	3,712	12
Groceries.....		215	37,625	10
Handle bolts.....	723 cords.....	2,308	9,750	16
Hay.....	9,600 bales.....	320	4,800	16
Heading bolts.....	30 cords.....	90	180	7
Horses.....	118 head.....	59	11,800	24
Logs.....	23,212,478 feet log scale.....	106,087	212,174	63
Lumber.....	3,165,600 feet b. m.....	6,331	37,986	8
Merchandise.....		529	39,675	16
Oats.....	9,450 bushels.....	150	6,000	12
Potatoes.....	7,590 bushels.....	230	4,600	10
Rice.....	213,550 bushels.....	4,843	133,402	53
Shells (mussel).....		7,690	115,200	30
Staves (rough).....	63,000.....	378	2,335	30
Stave bolts.....	930 cords.....	2,168	4,324	27
Ties (railroad).....	120,636.....	10,063	60,318	115
Miscellaneous.....		343	32,448	24
Total.....		165,280	833,414	64

8. WHITE RIVER AT DEVALL BLUFF, ARK.

No expenditures were made and no work was done during the year, the requirements in regard to local cooperation not having been complied with. A map of this locality is opposite page 2346, Annual Report of Chief of Engineers for 1913.

APPROPRIATIONS.

Mar. 4, 1913..... \$8,000

COMMERCIAL STATISTICS.

Boats of 6 feet draft could ply the river from its mouth to Devall Bluff (124 miles) at any time during the calendar year 1915.

The commerce which centered at Devall Bluff during the calendar year 1915 comprised:

Freight traffic.

	Short tons.	Estimated value.
Inbound:		
Saw logs.....	600	\$1,320
Mussel shells.....	200	3,000
Outbound, bauxite, barged to East St. Louis, Ill.....	14,420	61,265
Total.....	15,220	64,605

4. OPERATING AND CARE OF LOCKS AND DAMS NOS. 1, 2, AND 3, UPPER WHITE RIVER, ARK.

All operations were by hired labor, with Government plant.

Lock and Dam No. 1.—A flood that crested at a height of 14.7 feet over the lock walls on August 21, 1915, carried out the lower gate on the land side of the lock. This gate landed one-fourth mile from the river in a field on the left bank 3 miles below the lock. The gate was taken back to the lock intact and set in place and the lock reopened for operation September 13. The only repair involved in connection with the displacement and resetting of the gate was that of making new top hanger fastenings and one new gate spar. Other repairs made during the year were all of a minor nature, being confined to rebuilding the fish ladder and the housing over the hydraulic ram, to making small repairs to the bank paving below the abutment, to the paving on the lock terreplein, which was flushed with cement grout, and to upper guide cribs; to painting buildings, to raising the yard office building 3 feet to get it above the August flood line, and to rebuilding the coal chute twice, the second rebuilding being necessitated by a flood which crested at 15.1 feet over the lock walls on February 1, 1916. This flood did no material injury to this lock and dam. Some surface scouring took place on the point just above the abutment and in the field below and back of the abutment.

Lock and Dam No. 2.—The August, 1915, flood crested at 14.5 feet over the lock walls. It washed out 125 cubic yards of riprap filling from the lower land crib, displaced 5 square yards of the stone deck paving in the lower river crib, carried away the gate spar, guide rollers, and spar chain to the upper river gate, twisted the lower gate on the land side of the lock 12 inches out of miter, and washed away the new housing that had been built over the hydraulic ram earlier in the month. These damages were repaired in September. In December 210 cubic yards of one-man stone and 75 cubic yards of gravel were used in raising the topping to the abutment levee to 2 feet above the August, 1916, flood line.

The February, 1916, flood crested at 16.3 feet over the lock walls. This flood carried out both lower lock gates, carried away three gate spars and their attachments, destroyed 100 feet of levee in the lock-house yard, tore off the top decking and paving to the lower guide cribs, carried away the housing over the hydraulic ram, eroded a high-water channel in the field beyond the abutment, caused some slight settlement in the abutment levee (the top of which was just awash at the crest of the flood), and broke the dam in two places, one break being 85 feet long, the other 152 feet long. The 152-foot break began at 79 feet and the 85-foot break at 408 feet from the lock wall. The lock gates were recovered from the bottom of the river 600 feet below the lock and replaced, the lock being reopened for operation on March 15, 1916. The levee in the lock-house yard has been rebuilt and raised to a grade 1.5 to 2 feet above the February flood line. The lower cribs have been repaired and 1,300 square yards of the scoured area in the field beyond the abutment has been paved with one-man stone, 440 cubic yards having been used for this purpose. The abutment levee has been retopped. The closure of the 85-foot break in the dam was nearly completed, there lacking only about 45 linear feet of the lower half of the downstream face of the dam to be covered with slope timbers, when operations on this break were temporarily suspended June 8, 1916, because of a rising river. A start toward the closure of the 152-foot break was made and 636 cubic yards of derrick stone were placed in it, when operations were stopped because of rising river. This break is to be finally repaired with a concrete cap in lieu of the timber decking formerly used.

Lock and Dam No. 3.—In July, 1915, 4 miles of the telephone line were rebuilt and 58 new poles used in replacing old ones. In June, 1916, restretched 10 miles of wire, renewed 73 connections, set 25 new poles, and recleared $1\frac{1}{2}$ miles along the telephone line. The August, 1915, flood crested at 18.4 feet above the lock walls. The only damage it did was to tear off the wood deck and two runs of stringers on all guide cribs (four). It had been planned before the flood to rebuild those cribs, and most of the material had been assembled. In October and November the two upper cribs were rebuilt from 18 inches below normal pool level and the two lower cribs from a level corresponding with 5.5 feet on lower miter sill gauge. The housing over the hydraulic ram was rebuilt at this time and 607 cubic yards of one-man stone were used in repairing bank slopes below the abutment. The February, 1916, flood crested at 21.2 feet over the lock walls, but did no damage at this lock.

Floating plant.—Derrick boat No. 3 was burned at Lock No. 3 on the night of October 31, 1915. It was a total loss in all its parts. Derrick boat No. 4, the hull for which was launched March 17, 1916, has been built to replace it. Two barges were condemned and abandoned during the year. Other plant was kept in good serviceable condition.

Dredging in pools and approaches.—The operations of dredge No. 63 in the pools and approaches during the fiscal year 1916 were as follows:

Month.		Length.	Width.	Fin- ished depth.	Quan- tity.	Material.
1915.		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Cu. yds.</i>	
August.....	At mouth of Polk Bayou.....	700	30	5.0	2,400	Sand.
September.....	do. ¹	425	30	4.0	1,920	Do.
Do.....	do.....	475	55	4.0	2,450	Do.
September-October.....	Maxwell's Shoal.....	975	30	5.0	3,140	Gravel.
October.....	Earnheart Island.....	1,095	30	6.5	5,345	Do.
Do.....	Lock Pit No. 2.....				20	Mud.
Do.....	Batesville Shoal ²	410	30	6.5	1,075	Gravel.
Do.....	Lower approach, Lock No. 3.....	155	30	6.5	365	Mud.
1916.						
May.....	At mouth of Polk Bayou.....	475	30	8.0	2,325	
Do.....	Lower approach, Lock No. 2.....				18	Stone.
Do.....	Lock pit, Lock No. 2.....				125	Gravel.
Do.....	Upper approach, Lock No. 2.....				500	Mud.

¹ Immediate dredging in September made necessary by August flood.

² Also removed 9 snags and cut 52 trees.

The lowest stages during the year were 0.2 foot on crest of Dam No. 1 August 6, 1915; minus 2.1 feet on crest of Dam No. 2 May 31, 1916, and 0.7 foot on crest of Dam No. 3 August 5-6, 1915. The abnormally low water in pool No. 2 was the result of the breaks in that dam.

Floods.—Prior to this year the high water of May, 1898, has been considered the record flood save perhaps the one of 1844. This year it was exceeded twice. The comparison of this year's flood with the one of 1898 is shown in the following tabulation:

Comparison of three record floods in Upper White River, Ark.

Location of gauge.	May, 1898, flood. ¹	August, 1915, flood.	February, 1916, highest flood to date.	August, 1915, above May, 1898.	February, 1916, above August, 1915.	February, 1916, above May, 1898.
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
Calico Rock, open river gauge reading.....		48.5	51.0		2.5	
Lock No. 3:						
Depth on crest of dam.....	25.2	28.4	31.2	3.2	2.8	6.0
Depth over lock walls.....	15.2	18.4	21.2	3.2	2.8	6.0
Lock No. 2:						
Depth on crest of dam.....	18.4	24.3	26.3	6.1	1.8	7.9
Depth over lock walls.....	8.4	14.5	16.3	6.1	1.8	7.9
Lock No. 1:						
Depth on crest of dam.....	22.0	24.7	25.1	2.7	.4	3.1
Depth over lock walls.....	12.0	14.7	15.1	2.7	.4	3.1

¹ Dams not built in 1898. The stages shown in this column are the results of transferring the 1898 high-water line to the lock gauges.

APPROPRIATIONS.

[FOR CONSTRUCTION.]

Appropriations (H. Doc. 1491, 63d Cong., 3d sess., p. 577)-----	\$818,500.00
Less amount covered into surplus fund-----	309.02
	<hr/>
Allowed claim (Sept. 24, 1913)-----	818,190.98
	5.83
	<hr/>
Total cost of construction, Nos. 1, 2, and 3-----	818,196.81

Expenditures under permanent indefinite appropriations of 1884 and 1909.

Fiscal year.	Lock and Dam No. 1.	Lock and Dam No. 2.	Lock and Dam No. 3.	Total.
1904.....	\$361.86			\$361.86
1905.....	3,580.01	\$1,069.99		4,650.00
1906.....	2,711.60	37,086.30		39,797.90
1907.....	11,314.02	15,822.21		26,837.23
1908.....	4,510.85	37,642.08		43,064.25
1909.....	6,198.98	6,355.40	4,893.65	17,448.03
1910.....	8,196.49	7,442.28	7,545.44	23,184.21
1911.....	6,892.60	7,412.51	6,843.19	21,148.30
1912.....	9,514.13	17,763.00	8,565.51	35,842.64
1913.....	9,851.38	15,624.08	7,451.17	32,926.58
1914.....	12,503.72	15,082.30	9,258.07	36,793.99
1915.....	13,493.75	20,066.49	9,569.58	43,129.82
1916.....	11,069.55	18,276.28	15,395.16	44,740.99
Total.....	100,185.77	199,242.72	70,424.21	309,865.70

RECAPITULATION.

Total for construction, Nos. 1, 2, and 3-----	\$818,196.81
Total for maintenance, fiscal years 1904-1916-----	309,865.70
	<hr/>
Gross total to June 30, 1916-----	1,183,062.51

Summary of expenditures during the fiscal year ending June 30, 1916.

Classification.	Lock and Dam No. 1.	Lock and Dam No. 2.	Lock and Dam No. 3.	Total.
Services.....	\$4,916.77	\$10,449.48	\$8,141.71	\$23,507.96
Materials.....	2,830.49	3,163.31	3,768.80	9,762.60
Supplies.....	2,446.29	3,671.14	2,075.07	8,192.50
Property.....	693.64	850.28	819.19	2,363.11
Unclassified.....	169.36	162.07	560.39	921.82
Total this year.....	11,069.55	18,276.28	15,395.16	44,740.99

COMMERCIAL STATISTICS.

[Calendar year 1915.]

	Lock and Dam No. 1.	Lock and Dam No. 2.	Lock and Dam No. 3.	Intrapool commerce.
Lockages.....number.....	449	722	387	.....
Steamboats.....do.....	10	44	4	.....
Gasoline boats.....do.....	24	370	556	.....
Barges (towed).....do.....	27	379	166	.....
Launches and small boats.....do.....	366	252	208	.....
Railway ties.....short tons.....	1,716	1,808	592	4,766
Rough coopersge.....do.....	72	1,732	258	4,812
Wheel stumps (hub blocks).....do.....	16	1,861	1,242	4,147
Excelsior wood (blocks).....do.....	339	2,463	462	2,542
Farm products.....do.....	.....	185	87	25
Miscellaneous.....do.....	10	138	44	28
Total.....do.....	2,153	8,222	2,635	12,320
Estimated value.....	\$11,728	\$39,688	\$14,965	\$49,221

Total tonnage, excluding duplications shown in foregoing by reason of commerce passing through more than one lock.....short tons. 20,101
 Estimated value of total tonnage.....\$87,015

5. CACHE RIVER, ARK.

All operations were for maintenance by snagging operations with hired labor and Government plant. The expenditure during the fiscal year was \$2,597.77.

This work is done by a chopping party, using a hand-powered raising boat for lifting the snags, logs, etc. At the beginning of the fiscal year the party was working in the vicinity of the Missouri & North Arkansas Railway bridge, 56 miles above the mouth of the river. During July and August it worked downstream to Bayou Devieu, 12 miles above the mouth, where work was temporarily suspended because of high water. The outfit was taken to Brasfield (25.5 miles above the mouth), where it lay until November 3, work then being resumed at High Banks (8 miles above the mouth), and continued to the mouth of the river, where operations closed December 8, 1915. The movable property was shipped to Batesville. The boats were sold at public auction. By these operations 1,636 snags, 317 logs, 354 stumps, and 18 drifts were removed from the channel, 1,551 trees were cut, and 619 were girdled.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., p. 417).....	\$9,000.00
Existing project for maintenance of channel:	
Aug. 18, 1894 (allotted from White River appropriation).....	\$2,000.00
June 3, 1896 (allotted from White River appropriation).....	2,000.00
Mar. 3, 1899.....	1,000.00
June 13, 1902.....	2,000.00
Mar. 3, 1905.....	2,000.00
Mar. 2, 1907.....	2,000.00
Mar. 3, 1909 (allotment).....	3,000.00
June 25, 1910.....	3,000.00

Existing project for maintenance of channel—Continued.

Feb. 27, 1911.....	\$3,000. 00	
July 25, 1912.....	3,600. 00	
Mar. 4, 1913.....	2,000. 00	
Oct. 2, 1914 (allotment).....	1,750. 00	
Mar. 4, 1915 (allotment).....	3,000. 00	
		\$29,750. 00
Total of appropriations and allotments.....		38,750. 00
Received from sales, etc., fiscal years 1911-1914.....		203. 55
Received from sales, etc., fiscal year 1915.....		63. 90
Grand total.....		39,017. 85

COMMERCIAL STATISTICS.

Seasons of navigation, calendar year 1915.—The open and closed seasons referred to herein apply to the periods when the river was navigable to Gregory Branch Bridge, 68 miles above the mouth of the river, by motor launches of about 2 feet draft. Open at beginning of year; closed July 1; opened August 20; closed November 5; opened December 1 and open to end of year.

Vessel classification.

Class.	Number.	Net registered tons.
AMERICAN.		
Registered:		
Steamers.....	1	42
Motor boats.....	1	8
Unregistered:		
Motor boats.....	8	
Barges (towed).....	6	
Total.....	15	50

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value (estimated).	Average haul.
				<i>Miles.</i>
Heading bolts.....	148 ranks.....	148	\$222	6
Hay.....	2,220 bales.....	148	2,220	18
Logs.....	8,022,838 feet log scale..	36,423	71,950	11
Lumber.....	66,000 feet b. m.....	132	792	8
Miscellaneous.....		70	3,719	16
Total.....		36,423	78,903	11

6. BLACK AND CURRENT RIVERS, ARK. AND MO.

All operations during the fiscal year were for maintenance by hired labor with Government plant. The expenditures during the year were:

	For Black River.	For Current River.	Total.
Direct operation and care of snag boats.....	\$9,634. 09	\$2,322. 88	\$11,956. 97
Rebuiding Quapaw.....	2,827. 72	1,475. 42	4,303. 14
Total.....	12,461. 81	3,798. 30	16,260. 11

(A) BLACK RIVER.

The snag boat *Riverside* (hand propelled) came into this river from the Current River, July 1, 1915, working here between Gum Thicket Bend (84 miles above the mouth of the river) and Current River (96 miles above the mouth) until July 15, when it returned to Current River. It reentered Black River August 1, thence worked up to Poplar Bluff (213 miles above the mouth) arriving there December 5, 1915. From Poplar Bluff it worked back downstream to Pocahontas (91 miles above the mouth of the river), where it was placed in ordinary January 31, 1916, and where it remains at the close of the fiscal year.

The snag boat *Quapaw* entered this river from White River, November 1, 1915, and worked up to mouth of Current River, going into that river December 8, 1915.

Summary of work by snag boats "Riverside" and "Quapaw" in Black River.

Boat.	Work done between—	Distance.	Snags removed.	Stumps removed.	Logs removed.	Drifts removed.	Trees cut.	Trees girdled.	Miles run.
<i>Riverside</i>	Poplar Bluff and Gum Thicket Bend. ¹	<i>Miles.</i> 129	1,051	189	228	60	1,251	89	306
<i>Quapaw</i>	Mouth and mouth of Current River.	96	244	26	21	5	81	190	315
Total..	Mouth and Poplar Bluff.	213	1,295	215	249	65	1,332	279	621

Also removed wreck of barge at Pocahontas.

(B) CURRENT RIVER.

The snag boat *Riverside* worked in this river below the mouth of Little Black River, 32 miles, July 15–31, 1915, both dates included. It then went into Black River. The *Quapaw* worked here below Schumachers Ferry, 24 miles, December 9–15, 1915, both dates included, when it went to White River.

Summary of operations by snag boats "Riverside" and "Quapaw" in Current River.

Boat.	Work done between—	Distance.	Snags removed.	Stumps removed.	Logs removed.	Trees cut.	Trees girdled.	Miles run.
<i>Riverside</i>	Mouth and mouth of Little Black.	<i>Miles.</i> 32	64	15	.....	69	80	64
<i>Quapaw</i>	Mouth and Schumachers Ferry.	24	73	11	2	38	92	52
Total..	Mouth and mouth of Little Black River.	32	137	26	2	107	172	116

APPROPRIATIONS.

Appropriations for Black River have been made separately under the heads of "Improving Black River, Mo.," "Improving Black River, Ark.," and "Improving Black River, Ark. and Mo." This river is understood not to have

been included in the snagging operations under the early appropriations for snagging in western rivers. The appropriations for it and for Current River are:

	Black River.	Current River.
Previous projects, June 10, 1872 and Mar. 3, 1881.....		\$7,000.00
Existing project:		
June 14, 1880.....	\$15,000.00	
Mar. 3, 1881.....	6,000.00	
Aug. 2, 1882.....	10,000.00	
July 5, 1884.....	20,000.00	
Aug. 5, 1886.....	5,000.00	
Aug. 11, 1888.....	12,000.00	
Sept. 10, 1890.....	12,000.00	
July 13, 1892.....	5,000.00	
Aug. 18, 1894.....	9,500.00	8,000.00
June 3, 1896.....	8,000.00	2,000.00
Mar. 3, 1899.....	8,000.00	5,000.00
June 13, 1902.....	21,700.00	6,900.00
June 13, 1902 (emergency allotment, May 31, 1904).....	18,530.50	2,935.00
Mar. 3, 1905 (apportioned).....	13,000.00	5,000.00
Mar. 2, 1907 (apportioned).....	13,000.00	5,000.00
Mar. 3, 1909 (allotments).....	12,000.00	6,000.00
June 25, 1910 (apportioned).....	13,500.00	6,000.00
Feb. 27, 1911 (apportioned).....	4,100.00	3,000.00
July 25, 1912 (apportioned).....	12,000.00	3,000.00
Mar. 4, 1913 (apportioned).....	18,500.00	6,500.00
Oct. 2, 1914 (allotments).....	13,600.00	3,500.00
Mar. 4, 1915 (allotments).....	18,850.00	7,150.00
July 27, 1916.....	14,000.00	4,000.00
Total.....	271,280.50	73,985.00
Sales, for years 1907-1914.....	271,280.50	80,985.00
Sales, for year 1916.....	177.46	58.34
	8.00	
Grand total.....	271,462.96	81,043.34

¹ \$3,850 less \$319.50 not used and returned to Treasury.

COMMERCIAL STATISTICS.

Calendar year 1915.—Black River was open all the year for navigation by boats of not over 3 feet draft below the mouth of Current River, and for boats of not over 2 feet from the mouth of Current River to Poplar Bluff, Mo. Current River was open all the year for navigation by boats of not over 4 feet draft to Biggers, 23 miles. It was similarly open to Van Buren for the light-draft, flat-bottomed, stern-wheel motor boats of 8 to 10 inches draft operated on that section of the river.

Vessel classification.

Classes.	Black River.			Current River.		
	Number.	Net registered tons.	Passengers.	Number.	Net registered tons.	Passengers.
AMERICAN.						
Registered:						
Steamers.....	3	178	101			
Motor boats.....	5	88				
Unregistered:						
Motor boats.....	7		315	5		888
Barges (towed).....	15			3		
Total.....	30	266	416	8		888

Freight traffic.

BLACK RIVER.

Articles.	Amount in customary units.	Amount in short tons.	Value (estimated).	Average haul.
				Miles.
Cotton.....	632 bales.....	157	\$31,400	22
Cotton seed.....	3,360 sacks.....	163	2,445	75
Corn.....	1,800 bushels.....	50	1,350	60
Groceries.....		175	30,625	60
Handle blanks.....	63,000.....	126	3,150	37
Handle bolts.....	1,353 cords.....	3,536	14,500	46
Hay.....	5,670 bales.....	189	2,835	54
Heading bolts.....	163 ranks.....	163	1,160	55
Logs.....	22,521,407 feet log scale.....	104,886	209,772	25
Lumber.....	2,627,100 feet b. m.....	7,264	43,524	57
Merchandise.....		403	30,225	63
Oats.....	6,300 bushels.....	100	4,000	60
Shells, mussel.....		2,475	37,125	50
Shingles.....	940,000.....	140	9,100	34
Staves.....	183,000.....	1,060	8,175	41
Stave bolts.....	2,640 cords.....	6,636	12,273	29
Ties, railway.....	6,240.....	520	3,120	21
Miscellaneous.....		200	21,420	55
Total.....		128,263	467,199	35

CURRENT RIVER.

Handle bolts.....	30 ranks.....	81	\$324	6
Logs.....	1,002,000 feet log scale.....	5,010	10,020	21
Ties, railway.....	12,608.....	1,124	12,860	12
Miscellaneous.....		146	5,661	17
Total.....		6,371	31,865	20

7. ST. FRANCIS AND L'ANGUILLE RIVERS AND BLACKFISH BAYOU, ARK.

All operations during the fiscal year were for maintenance by hired labor with Government plant. The expenditures during the year were:

For St. Francis and L'Anguille Rivers.....	\$4,232.54
For Blackfish Bayou.....	500.00
Total.....	4,732.54

The snag boat *A. B. Johnson* (hand propelled) lying in ordinary at Madison, 60 miles above the mouth, at the beginning of the year, was placed in commission July 4, 1915, and after annual repairs were completed was towed to Marked Tree, 148 miles above the mouth, where snagging operations began July 17. The boat worked downstream to Ash Bend, 98 miles above the mouth, where operations were suspended on September 15 because of high water. The *A. B. Johnson* was taken to Madison and laid up. Operations were resumed at Madison November 5, the boat working from there downstream to Blackfish Bayou, 38 miles above the mouth, which stream it entered November 16. The *A. B. Johnson* worked in Blackfish Bayou up to Fifteenmile Bayou—6 miles—until December 1, when it returned to St. Francis River. It then worked down to L'Anguille River, 12 miles above the mouth, entering that stream December 14, and working in it below Marianna—8 miles—until December 27,

when operations were closed. The *A. B. Johnson* was towed to Madison and placed in ordinary December 31, 1915, and remains there at the close of this fiscal year.

Summary of snagging operations this fiscal year.

Stream.	Work done between—	Dis- tance.	Snags re- moved.	Stumps re- moved.	Logs re- moved.	Drifts re- moved.	Trees cut.	Trees gh- died.
		<i>Miles.</i>						
St. Francis...	Mouth of L'Anguille and Marked Tree.	136	483	62	144	15	382	1,953
Blackfish...	Mouth and Fifteenmile Bayou.	6	82	.....	48	.....	42	248
L'Anguille...	Mouth and Marianna.....	8	26	.....	3	.....	117	514
Total.....	.....	150	589	62	196	15	541	2,715

APPROPRIATIONS.

The earlier examinations and the earlier appropriations for St. Francis River, Ark., were made under appropriations for it in conjunction with White River, Ark. Of the expenditures under those appropriations this office has no record. The separate appropriations for the entire St. Francis River are classified in one list in House Document 1491, Sixty-third Congress, third session.

Previous projects:

Mar. 3, 1871-June 13, 1902 (see H. Doc. 1491, 63d Cong., 3d sess., p. 542).....	\$180,500.34
Less appropriations for St. Francis River, Mo. \$30,500.00	
Less appropriation for levee along Walnut bend of Mississippi River.....	75,000.00
	105,500.00
Amount for previous projects, St. Francis River, Ark.....	75,000.34
June 13, 1878-June 13, 1890, L'Anguille River (see H. Doc. 1491, 63d Cong., 3d sess., p. 542).....	17,000.00

Total for previous projects, St. Francis and L'Anguille Rivers, Ark.....	92,000.34
Existing project:	
St. Francis and L'Anguille Rivers—	
June 13, 1902.....	\$9,000.00
May 31, 1904.....	4,237.19
Mar. 3, 1905.....	6,000.00
Mar. 2, 1907.....	12,000.00
Mar. 8, 1909 (allotment).....	9,000.00
St. Francis and L'Anguille Rivers and Blackfish Bayou, Ark.—	
June 25, 1910.....	9,500.00
Feb. 27, 1911.....	2,500.00
July 25, 1912.....	9,000.00
Mar. 4, 1913.....	7,000.00
Oct. 2, 1914 (allotment).....	1,000.00
Mar. 4, 1915 (allotment).....	8,000.00
July 27, 1916.....	9,500.00
	86,737.19
Total.....	178,737.53
Received from sales, etc., fiscal years 1909-1915.....	69.16
Received from sales, fiscal year 1916.....	.98
Grand total.....	178,807.67

COMMERCIAL STATISTICS.

Season of navigation, calendar year 1915.—The St. Francis River was open for navigation by boats of 3-foot draft to Marked Tree, 148 miles, all the year. The L'Anguille to Marianna, and the Blackfish Bayou to Fifteenmile Bayou were similarly open excepting for 10 days during November, 1915, when the maximum draft was limited to 2 feet.

Vessel classification.

Class.	Number.	Net registered tons.	Passengers.
AMERICAN.			
Registered:			
Steamers	4	493	
Motor boats	9	86	1,140
Unregistered:			
Motor boats	19		511
Barges (towed)	16		
Total	48	579	1,650

Freight traffic.

Article.	Amount in customary units.	Amount in short tons.	Value (estimated).	Average haul.
Brick	84,400	211	\$844	<i>Miles.</i> 21
Cotton	1,616 bales	404	80,800	30
Cotton seed	8,150 sacks	652	19,560	22
Corn	5,076 bushels	141	3,807	22
Groceries .....	.....	117	20,475	31
Hay	4,140 bales	138	2,070	22
Hogs	1,260	129	10,320	25
Logs	32,070,838 feet log scale	141,342	282,694	21
Lumber	1,082,500 feet b. m.	2,165	12,990	42
Merchandise .....	.....	81	6,075	20
Mussel shells .....	.....	50	835	20
Staves	135,500	812	1,624	10
Miscellaneous .....	.....	191	20,416	27
Total .....	.....	146,442	402,500	31

IMPROVEMENT OF RIVERS AND HARBORS IN THE ST. LOUIS, MO., DISTRICT.

REPORT OF MAJ. WILDURR WILLING, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Mississippi River between the Ohio and Missouri Rivers.....	2581	2. Removing snags and wrecks from the Mississippi River below the mouth of the Missouri River, and from Old and Atchafalaya Rivers.....	2598

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 1084 TO 1090.

1. MISSISSIPPI RIVER, BETWEEN THE OHIO AND MISSOURI RIVERS.

WORKS OF IMPROVEMENT.

The standard forms of construction were used. During the year, works of permanent improvement by hired labor were in progress September 13 to December 28, 1915, as hereinafter described, at Sulphur Springs, Penitentiary Point, Fort Chartres, Turkey Island, Ste. Genevieve, Crain Island, Liberty, Wilkinson, La Courç Island, Union Point, Crawford, Hanging Dog Island, Devils Island, Price Landing, Eliza Towhead, Cairo Protection, and Greenfield Bend, and under contract October 13 to December 27, 1915, and March 10 to 27, 1916, at Kaskaskia Island. Two of the four suction dredges under this office were in commission during the low-water season from September 7, 1915, to December 31, 1915, and were operated on eight channel bars which developed during that time. A hydrographic survey, not continuous, was made, covering in aggregate about 100 miles, including all dredged channels, shoal crossings, and caving banks. River gauges were maintained and read throughout the year and were inspected and repaired as required. The plant was repaired and cared for at the engineer depot, St. Louis, and in the fleet at Graysboro, Mo.

Materials were procured by contract and open-market purchases and by hired labor, as was deemed most advantageous to the department.

CONSTRUCTION WORKS—HIRED LABOR.

NOTE.—Station numbers, wherever shown herein, refer to an origin at the upstream end of the work at that locality. River stages, unless otherwise noted, refer to the St. Louis gauge.

SULPHUR SPRINGS, ILL. (24 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Nov. 19-Dec. 22, 1915.]

Hurdle dikes, repair.—In order to strengthen and hold the outer ends of the hurdles which had been much worn away during recent years at this locality, Nos. 10½, 11, 12, 13, and 14 were repaired with piling and stringers throughout lengths of 50, 160, 200, 150, and 65 feet, respectively. To prevent further bank caving along these hurdles, 1,380 linear feet of shore mattresses were built at their roots as follows: No. 12, 110 feet; No. 13, 320 feet; and No. 14, 950 feet. A spur hurdle 75 feet in length was built near Hurdle No. 14 to prevent the formation of a destructive eddy.

Bank revetment, repair.—Between stations 100 and 124+75 repairs aggregating 71,100 square feet were made to the stone paving along 1,745 linear feet of bank, and new stone paving aggregating 27,600 square feet was placed to the elevation of the 12-foot river stage along 1,270 linear feet of bank between stations 136+30 and 156+20. The bank-protection mattress was repaired along 915 linear feet (96,200 square feet) of bank between stations 115+90 and 127+90.

PENITENTIARY POINT, ILL. (44 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Nov. 5-Dec. 3, 1915.]

Hurdle dike, repair.—The hurdle was repaired throughout 1,050 feet of its length at the outer end and the T head was entirely reconstructed. The drift accumulated along 475 linear feet of the hurdle was overlaid in the usual manner with woven-wire fencing and weighted with stone.

FORT CHARTRES WEST (48 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 19-30, 1915.]

Hurdle dam, repair.—Hurdle Dam No. ½, located about 100 feet below the head of Establishment Island and across the slough between the island and the main Missouri shore, had been breached at its eastern or island end, and also damaged near the Missouri shore. The gap, 100 feet in width, was closed, and the damaged cribwork of piling and stone at the west end was repaired with brush and stone. A large quantity of drift accumulated above the hurdle along 420 feet of its length was overlaid with a brush mat and weighted with stone.

Bank revetment, repair.—Between stations 0+20 and 15 the stone paving, aggregating 7,000 square feet, was repaired throughout 360 linear feet of bank.

FORT CHARTRES, EAST (50 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 30-Nov. 11; Dec. 2-6, 1915.]

Bank revetment, repair.—Between stations 24 and 56+50, 38,700 square feet of stone paving were repaired along 2,375 linear feet of bank, and two spur hurdles 50 feet in length were placed in an eddy at stations 34+20 and 35+60.

TURKEY ISLAND, ILL. (51 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Nov. 11-18, 1915.]

Bank revetment, repair.—Between stations 69+70 and 94+10, 21,400 square feet of stone paving were placed in repairs along 760 linear feet of bank.

STE. GENEVIEVE, ILL. (56 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 25-Nov. 4, 1915.]

Hurdle dike No. 2, repair and restoration.—This hurdle, which was built during 1913, suffered a loss of 200 feet at its outer end during the spring of 1914. The depth of water along the destroyed section being not excessive during the present year, the hurdle was restored for a distance of 250 feet, to its original length, and a T-head 50 feet in length was driven at its outer end. The drift accumulated above 390 linear feet of the hurdle near the shore end was overlaid with woven wire fencing and weighted with stone.

In the aggregate there were placed 48,200 square feet of foundation mattress, 296 piles, and 22 stringers, and 5,800 square feet of drift were sunk.

CRAIN ISLAND, MO. (76 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Sept. 13-Oct. 28, 1915.]

Hurdle dikes, extension and repair.—Hurdle No. 9, which had been constructed to a length of 2,500 feet, was not completed because of insufficient depth of water at the outer end. The usual scouring action of the river having increased the depth, the hurdle was extended 800 feet, to its ultimate length, 3,300 feet, and a 60-foot T-head was constructed at the outer end. The hurdle was strengthened throughout 100 feet of its length, and a drift mattress, 1,390 linear feet, was built and weighted with stone.

Hurdle No. 15, repair.—A gap 300 feet in length in this hurdle was closed, and repairs were made throughout 150 feet of the piling; the drift accumulated above the hurdle along 200 feet of its length was overlaid with a mattress and weighted with stone.

In the work done on hurdles Nos. 9 and 15, 79,800 square feet of foundation mattress, 1,130 piles, and 85 stringers were placed, and 23,900 square feet of drift were sunk.

Bank revetment, extension.—Between stations 63 and 69, the bank paving on Crain Island was raised from the 16-foot to the 22-foot stage, 9,900 square feet being placed.

LIBERTY, MO. (85 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Sept. 16-Oct. 10, 1915.]

Hurdle Dam No. 15, new and repair.—This hurdle was built in 1913 between the main Missouri shore and the west side of Liberty Bar. The continued high stages of the spring and summer washed away the bank at its main shore end for a width of 100 feet, and at the other end, originally on a sand bar, 100 feet of the hurdle was washed out and the bar cut away for 250 feet in addition. To close

these gaps mattresses were constructed at both ends of the hurdle, the piling of which was then extended to the new banks, which were graded and paved. The total extensions are 475 feet, making the present length of the hurdle 1,350 feet. In all 58,400 square feet of foundation mattress, 21,500 square feet of stone bank paving, 426 piles, and 29 stringers were placed.

WILKINSON, ILL. (92 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 14–Nov. 18, 1915.]

Bank revetment, new.—The bank both above and below the protection placed during the fiscal year 1914 caved rapidly during the high stages of the spring and summer, the maximum erosion being about 450 feet at a point about 2,000 feet below the foot of the protection, where a large eddy working upstream had destroyed about 100 linear feet of the work.

The mattress was extended from station 97+90 to 100+10 and from 131+70 to 141, 1,185 linear feet (151,700 square feet) being placed. The bank was graded and paved to the top throughout the same limits, 62,100 square feet of paving being placed. The original mattress was 3,180 feet in length from station 100 to 131+80.

LA COURS ISLAND, ILL. (94 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 5–26, 1915.]

Hurdle dike, restoration.—The spring and summer high stages cut away the bank, destroying the shore protection and 190 linear feet of hurdle adjacent thereto. The usual foundation mattress was placed and the gap was closed with piling. Owing to the excessive depth of water (40 feet) on the old hurdle line, the repair line is inclined upstream in much shoaler water, making an angle of about 30° at the junction with the old line. On account of a destructive eddy below the hurdle, the shore protection was extended 440 feet downstream.

In all 270 linear feet of hurdle were restored, in which 59,000 square feet of mattress, 24,600 square feet of stone paving, 204 piles, and 15 stringers were placed.

UNION POINT, ILL. (109 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 23–Nov. 16, 1915.]

Hurdle Dike No. 6, restoration.—About 280 linear feet of the outer end of this hurdle were broken down by ice during the preceding winter, leaving the foundation mattress intact. This section was restored by driving 340 piles in 3 rows of clumps and placing 22 stringers.

CRAWFORD, MO. (111 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Nov. 17–Dec. 9, 1915.]

Hurdle dike, repair.—Throughout 350 feet at the outer end of this hurdle ice and drift had broken down the piling, leaving the

tops at about the 10-foot stage. This was repaired by driving 86 piles, singly or in clumps, immediately below the old piles, and placing along them 9 stringers.

HANGING DOG ISLAND, ILL. (114 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Nov. 20, 26; Dec. 10, 12, 1915.]

Hurdle Dike No. 9, repair.—The short section of mattress placed at this locality in 1914 has been flanked by the river, and considerable damage has been done to the piling and shore protection of hurdle No. 9. Repairs were made by placing 2,900 square feet of bank paving, 7 piles, and 1 stringer.

DEVILS ISLAND, ILL. (125 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 14; Nov. 21–Dec. 20, 1915.]

Hurdle Dam No. 1, repair and restoration.—This dam, constructed across the chute between the head of Devils Island and the main Illinois shore during the fall of 1897, was originally 1,200 feet in length, but has been increased by repairs and extensions to its present length of about 2,000 feet. For several years it was fronted and protected by an extensive bar, which has been partially washed away exposing the lower half of the dam, the piling of which is decayed and broken down. As the accretions behind the dam are high, they were graded and paved with stone, but the lost piling was not replaced. There was a gap of 190 feet wide in the dam at its upper or shore end, in which the foundation and shore mattresses were found uninjured, although the bank had receded about 30 feet. A mattress, lightly ballasted with stone, was placed between the old shore mattress and the new bank, and was carried to the top of the latter, as the river fell so rapidly that barges could not be brought over the bar to the bank with sufficient stone for paving of regular thickness. In all, 11,000 square feet of mattress, 6,400 square feet of stone paving, 103 piles, and 5 stringers were placed.

Bank revetment, repair.—Several detached sections of mattress, total 37,800 square feet, were placed in front of hurdle Dam No. 1, between stations 73 and 78+40. The bank between stations 70+80 and 79, was graded and paved to the top, approximately to the 23-foot stage, 48,700 square feet of paving being placed. On Devils Island, several small breaks in the paving between stations 81 and 88, 168 and 173, and at station 200 were repaired, 19,100 square feet of paving being placed. The spur hurdles in the eddies at stations 117 and 138 were repaired.

PRICE LANDING, MO. (153 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 15–22; Dec. 21–28, 1915.]

Bank revetment, repair.—Several small breaks in the paving, generally due to eddies, were repaired by placing short sections of mattress and regrading and paving the bank. In all, 44,200 square feet of mattress were placed between stations 182+50 and 191+80, and 37,900 square feet of stone paving between stations 150 and 182.

ELIZA TOWHEAD, ILL. (175 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Nov. 25-Dec. 21, 1915.]

Bank revetment, new, and repair.—The bank at this locality had caved rapidly during the preceding summer and threatened to flank the head of the detached section of revetment placed December, 1911, beginning at station 65. During the present season the mattress, which was made unusually wide (160 feet), was extended upstream from station 65+95 to 57+65, 131,600 square feet being placed. The bank was graded and was paved to the 30-foot stage (Cairo gauge) from station 57+65 to 62+65, and below the latter station the paving was raised about 10 feet higher to the top of the bank, 36,500 square feet being placed. In repair, 7,000 square feet of paving were placed between stations 65 and 68.

CAIRO PROTECTION, ILL. (177 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Nov. 29, 30; Dec. 3, 1915.]

Bank revetment, repair.—A small break in the paving, 5,600 square feet, between stations 98+50 and 100 was repaired.

GREENFIELD BEND, MO. (180 MILES BELOW EADS BRIDGE, ST. LOUIS).

[Oct. 22-Nov. 28; Dec. 16-22, 1915.]

Bank revetment, new, and repair.—A section of mattress 175 feet in width (50,400 square feet) was placed between stations 51+50 and 54+95, where the old mattress and paving had sunk, and the bank between these stations was regraded and paved to the 33-foot stage, 20,600 square feet being placed. At the lower end of the work the mattress was extended from station 68+25 to 81+30. It was made 160 feet wide to station 80, at the upper end of an abandoned railroad incline and 60 feet wide for a distance of 130 feet along the outside of the incline, 202,700 square feet in aggregate being placed. The bank was graded between stations 68+25 to 71, and 4,500 square feet of paving were placed in a narrow strip along the shore edge of the mattress.

CONSTRUCTION WORKS—CONTRACT.

KASKASKIA, ILL. (69 MILES BELOW EADS BRIDGE, ST. LOUIS.)

[Oct. 18-Dec. 27, 1915; Mar. 10-27, 1916.]

Bank revetment, new.—Under contract with Rust & Swift, of St. Louis, the construction of subaqueous mattress discontinued in May, 1915, because of high river stages, was resumed and 3,610 linear feet (451,200 square feet) were built between stations 110+20 and 146+30. The outline of the bank being very irregular, a number of detached "pocket" mattresses, totaling 38,900 square feet, were built between the same limits.

During the fall season, the bank, throughout the section protected by the mattress, was graded for stone paving, using the hydraulic method and hand shovels, a drag-line scraper, teams with plows and scrapers, and a sluice box extending from the top of the bank to the water to remove material shoveled by hand.

During the fall and spring seasons the paving was completed to the bankfull stage (26 feet, Chester gauge), 263,700 square feet

being placed. Completion of this contract, involving about 1,500 linear feet additional, is contemplated when the river reaches a stage sufficiently low for advantageous work.

DREDGING.

Unusually high stages with more than ample depths for navigation prevailed throughout the greater part of the low-water season of 1915, and less than half the usual amount of dredging was required.

The average daily stage for July, August, and September was nearly 25 feet on the St. Louis gage, or 10 to 15 feet higher than normal for those months.

Several bars of 8½ and 9 feet depths developed early in September, and threatening to become obstructive to 8-foot navigation, the two self-propelling dredges *Fort Gage* and *Fort Chartres*, were accordingly placed in commission, September 7, but considerable rise in stage then occurred and no dredging was required until the middle of October. During the remainder of the season these two dredges did all work required, and as the nonpropelling dredges *Selma* and *Thebes* were not needed, they were not placed in service.

The *Fort Gage* was in commission September 7 to December 31 (116 days), and during 38 working days dredged across 6 channel bars; the *Fort Chartres* was in commission September 5 to December 24 (111 days), and during 14 working days dredged across 2 channel bars; also, while not needed for channel work, the *Fort Chartres* cleared out in 15 days, below Grays Point (137), a new harbor for the floating plant of this engineer district.

The two dredges were operated for a total of 611½ hours, a little more than only one-ninth of their total time in commission, and maintained a good 8-foot channel throughout the district during the low-water season until navigation was stopped by ice (Dec. 28), when they were placed in winter harbors, the *Fort Gage* at United States Engineer depot (8), and the *Fort Chartres* at Graysboro (139). These dredges were also used to assist the one towboat in commission to deliver materials and supplies, and to patrol and sound the steamer channel from St. Louis to Cairo.

Seven main channel bars were dredged, of which one was dredged twice (Brewer Point); and work at two others (Danby and Grand Tower) was discontinued for short periods because of high river stages and the urgent need of the dredges for towing.

Beneficial results were obtained in all cases although the dredging at Grand Tower was not fully completed in width; on account of packed gravel and bowlders accumulated in the bottom of this channel the cut could be dredged to only 1 foot below the zero of the Grand Tower gauge, whereas the original bottom of this channel (dipper dredged, 1909 to 1912) was 2 to 4 feet lower. The accumulation of large and heavy solid materials is probably due to the previous long-continued high stage of river (for almost entire year) bringing such material from the upper reaches of the river.

The gain in depth due to dredging of bars varied from 3½ to 5½ feet; the total length of the seven completed channels having widths of 200 feet or more was 2¼ miles. The total amount of material dredged was 513,600 cubic yards, giving an average dredge rate of 840 cubic yards per hour.

Table of work done by U. S. dredges "Fort Gage" and "Fort Chartres" during the fiscal year ending June 30, 1916.

Dredge.	Bars dredged.	Mileage from St. Louis (Eads Bridge).	Inclusive dates.	Days' dredging.	Actual dredging time.	Material removed.	Cuts made.	Total length of cuts.	Dredged channel.			Gain in depth.
									Length.	Depth.	Width.	
		Miles.	1915.		Hours.	Cu. yds.	No.	Feet.	Feet.	Feet.	Feet.	Feet.
Fort Gage.....	Meramec River.....	19	Dec. 23-27.....	5	46	40,100	7	7,750	1,400	10	200	4
Fort Chartres.....	Danby.....	42	Nov. 10-15; Nov. 23-24.....	8	834	92,800	9	11,925	2,150	12	225	54
Do.....	Stanton.....	61	Oct. 17-22.....	6	54	54,600	6	9,675	2,000	134	225	44
Fort Gage.....	Grand Tower.....	103	Nov. 23-24; Nov. 27-30; Dec. 6-12.....	13	92	51,600	7	12,600	2,300	14	160	4
Do.....	Schenemann.....	121	Nov. 2-7.....	6	564	61,900	4	9,075	2,300	104	200	24
Fort Chartres.....	Grays Point.....	139	Dec. 2-18.....	15	130	130,000	8	10,000	2,300	14	175	54
Fort Gage.....	Silding Island.....	153	Nov. 16-20.....	5	35	62,000	5	8,025	2,000	12	200	34
Do.....	Brewer Point.....	166	Oct. 24-26.....	3	50	31,400	8	4,575	726	12	200	44
Do.....	Brewer Point, lower.....	167	Nov. 10-15.....	6	644	59,000	9	10,275	1,600	94	250	44
				67	611½	513,900	63	83,900	.....	.....	.....	.....

¹Not in main channel; winter harbor for floating plant.

²483,000 cubic yards dredged from main channel.

RIVER STAGE.

During the entire year, with the exception of short periods in November, December, January, and March, the river stage was unusually high, and with the exceptions, total only 28 days, in the months mentioned, the stages were above the mean daily stages.

Five very marked rises within three months, one in July, two in August, one in January–February, and one in May, equaled or slightly exceeded the flood or “bankful” stage (30 feet) at St. Louis, and in the first four instances established new records for extreme high stages on their dates of occurrence. The mean stage for the year was 19.3 feet, or 6.9 feet above the mean stage for 55 years, St. Louis gauge.

St. Louis gauge, 1914–15.

Date.	Highest monthly gauge readings.	Date.	Lowest monthly gauge readings.	Normal range, 55 years continuous records.
	Feet.		Feet.	Feet.
1915.		1915.		
July 23.....	31.2	July 10.....	22.0	20.0–14.5
Aug. 22.....	30.4	Aug. 31.....	19.5	14.5–9.5
Sept. 18.....	24.3	Sept. 10.....	12.5	9.5–9.0
Oct. 3.....	22.2	Oct. 31.....	11.0	9.0–8.0
Nov. 30.....	15.5	Nov. 14.....	7.4	8.0–7.0
Dec. 1.....	14.9	Dec. 29.....	3.2	7.0–5.5
				5.5–7.0
1916.		1916.		
Jan. 31.....	31.4	Jan. 1.....	4.0	7.0–8.0
Feb. 1.....	31.4	Feb. 16.....	12.8	8.0–11.5
Mar. 31.....	26.2	Mar. 14.....	11.3	11.5–16.5
Apr. 1, 2.....	26.2	Apr. 30.....	21.9	16.5–19.0
May 31.....	30.0	May 13.....	21.1	19.0–18.0
June 1.....	29.7	June 30.....	22.6	18.0–20.0

CHANNEL CONDITIONS.

Channel conditions were under constant surveillance by the district towboats and dredges while in commission from September 1 to December 31. During July and August, and the following spring season, the steamers were not in commission, with the exception of one towboat employed in towing plant from Graysboro to St. Louis during the early part of May.

During the fall season between the mouth of the Missouri River (–16) and St. Louis (0), the legally required 6-foot depth was maintained by natural action of the river; between St. Louis (0) and the mouth of the Ohio River (183), a channel of required dimensions, 8 feet depth and 200 feet width, was maintained, except for short periods of time at the seven bars hereinafter noted, where the required dimensions were quickly obtained by dredging or by the action (natural scour) of the river itself.

The least depths observed throughout the year were as follows: In July and August, unusually high stages prevailed and channel depths were more than ample for navigation. In September, 8 feet at Moro Island (60) on the 10th; in October, 8 feet at Schenimann (121) on the 28th; in November, 6½ to 7 feet, at Brewer Point (166) 10th to 14th, and at Sliding Towhead (159) on the 16th and 17th; in December, 6 feet at Schenimann (121) on the 25th, and 7½ feet at four other bars, on the 22d and 23d. Ruling depths on other

shoalest bars were not less than 8 feet. Navigation was practically stopped by snow on the 24th and 27th of December. The river stages always being higher during the spring season, the channel depths reported were equal to or greater than project requirements.

Steamer channel reports giving steering directions and least depths on bars, as ascertained by pilots of this office on through trips, were issued during the fall season to vessels and the public through the Lighthouse Service.

SURVEYS, EXAMINATIONS, AND CHANNEL MARKS.

A hydrographic survey was made, covering about 100 miles of river, or one-half of the entire district between the mouths of Ohio and Missouri Rivers.

Fourteen new triangulation stations were established. Fourteen miles of levees in Illinois were located and 14 miles of levels were run between the river gauges at Grays Point and Commerce.

Surveys, general and special, were also made as required, and included all localities where construction works or dredging were in progress or immediately prospective; also where considerable changes, due to caving banks and shifting channels, had taken place.

Also, dredged channels were marked with buoys and steering ranges in addition to the regular beacon lights of the Lighthouse Service.

PHYSICAL DATA.

The river gauges were maintained and read daily throughout the year and their records were checked by plotting on the official hydrograph.

During the year the river at St. Louis oscillated 28.2 feet, between stages 27.4 feet (Jan. 31, Feb. 1) above and 0.8 foot (Dec. 29) below standard low water (4 feet, St. Louis gauge). The normal yearly oscillation is about 24.7 feet, between 22.9 feet above and 1.8 feet below standard low water.

During the extreme high stage in July, three measurements of discharge of the Mississippi River were made at the mouth of River des Peres (8), St. Louis, with results as follows:

Date.	St. Louis gauge.	Area of cross section.	Mean depth.	Width of water-way.	Mean velocity.	Volume of discharge.	Method.	Oscillations.
1915.	<i>Feet.</i>	<i>Sq. ft.</i>	<i>Feet.</i>	<i>Feet.</i>	<i> Ft.-sec.</i>	<i>Sec.-cu.-ft.</i>		
July 1.....	29.25	76,500	43.3	1,767	6.79	519,700	Meter.....	F.
2.....	29.25	74,750	42.3	1,767	7.20	538,500	Rod floats....	F.
3.....	27.90	60,350	39.8	1,740	6.55	454,500	.....do.....	F.

MATERIALS.

For the permanent works of improvement, construction, and repair of hurdle dikes and bank revetments 12,195.08 tons (2,000 pounds) of coal, at a cost of from \$1.38 to \$2.25 per ton, were supplied by contract; 74,392 linear feet (1,493 sticks) of pile timber, at an average cost of 11 cents per linear foot; 40,927 cubic yards of stone and spalls, at from 60 to 69 cents per cubic yard; and 119,630 feet b. m. of mattress lumber at an average cost of \$14.45 per M. feet b. m., were purchased in open market; and 8,042 cords of brush, at \$1.82

per cord, were procured and loaded on Government barges by hired labor.

In construction of bank revetment at Kaskaskia Island, under contract, 495,200 feet b. m. of mattress lumber, at \$34 per M. feet b. m., and 15,212 cubic yards of stone and spalls, at \$1.59 per cubic yard, were furnished and placed by the contractor in completed work.

All other materials, supplies, stores, subsistence, etc., were purchased under competitive bids therefor or in open market and were collected and tested at the engineer depot, St. Louis, Mo., and thence distributed to the various working parties. All coal was tested for payments on the British thermal-unit basis. The following tests of samples of materials were also made for other engineer offices: Coal and rope, secretary's office, Mississippi River Commission; rope, engineer offices, San Francisco, Cal., first and second districts; Cincinnati, Ohio; Nashville, Tenn.; and inspection of castings for Portland, Oreg., engineer office and United States Lighthouse Bureau, San Francisco, Cal.

Numerous inspections were made, as required, of materials and appliances purchased in this vicinity by the Panama Canal.

PLANT.

All plant required for service was maintained in condition by repairs in ordinary upkeep and received extraordinary repairs and rebuilding as necessary to fit it for present and future service. The towboats of this office, *William R. King* and *General J. H. Simpson*, three steel steam tenders, and two smaller wooden tenders were thoroughly repaired. One very old small wooden tender, the *Cahokia*, was sunk November 13 in very deep water while in tow en route to St. Louis, and could not be recovered. Repairs incident to active service were made to the four suction dredges. Repairs were made also to 6 quarter boats, 2 wood-hull derrick boats, 27 wood-hull barges, 4 steel barges, 11 wood-hull pile drivers, 4 steel-hull pile drivers, 2 steel-hull grader and derrick boats, and 1 wood-hull store boat. Repairs were made as required on the steamer *Oleander*, belonging to the Lighthouse Service, for which reimbursement was or will be made by the lighthouse appropriations.

At the Little Rock Quarry, as well as at the engineer depot, St. Louis, the derricks, drills, tracks, cars, and all machinery, tools, and appliances and buildings were kept in good condition.

The total amount appropriated from July 4, 1836, to March 4, 1915, is \$17,956,599.98, as shown on pages 488 and 490, House Document 1491, Sixty-third Congress, third session, under the following headings:

Illinois River to Ohio River.....	\$4, 110, 000. 00
Missouri River to Ohio River.....	13, 748, 599. 98
Missouri River to Meramec River.....	100, 000. 00
Total	17, 956, 599. 98
Appropriated by river and harbor act of July 27, 1916.....	350, 000. 00
	18, 306, 599. 98

Of the above total amount there was appropriated in the years 1836, 1837, and 1844 for pier near St. Louis and obstructions in harbor of St. Louis (not considered in previous project of 1872 nor existing project of 1881) the sum of..... \$75, 000. 00

By the acts of 1872, 1874, 1875, 1876, 1878, 1879, 1880, 1882, 1890 there was allotted for work above the mouth of the Missouri River (not in the present district) the sum of-----	\$205, 000. 00
From the appropriation of 1879 there reverted to the Treasury the amount allotted by the act for Wittenberg, Mo -----	10, 000. 00
	<hr/> \$290, 000. 00

Leaving for work in the present district between the mouths of Missouri and Ohio Rivers under general acts for work in the district and special acts for work at certain localities in the district-----	18, 016, 599. 98
Receipts from sales-----	88, 255. 07

Total -----	18, 104, 855. 05
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There was expended on the original project under the acts of June 10, 1872, to June 14, 1880, inclusive, \$1,495,000, and under the existing project of 1881 there has been expended to June 30, 1916, \$16,071,901.82. The amount unexpended June 30, 1916, is \$187,953.23. The river and harbor act of July 27, 1916, appropriated \$350,000, making a total of \$537,953.23. The outstanding liabilities June 30, 1916, are \$8,062.26, and amount covered by contract in force \$79,183.54, leaving \$448,770.85 available for the coming year, in addition to \$1,936.58 due from other appropriations.

Amount expended during fiscal year-----	\$337, 455. 08
Reimbursable-----	6, 700. 42
Total -----	<hr/> 330, 754. 66

APPROPRIATIONS.

[See H. Doc. No. 1491, 63d Cong., 3d sess., pp. 488 and 490.]

Under former projects, from July 4, 1836, to Mar. 3, 1881, inclusive, and under the following heads: Pier near St. Louis and obstructions in harbor of St. Louis, years 1836, 1837, and 1844, \$75,000; Illinois to Missouri Rivers, year 1872, \$25,000; Missouri River to Meramec River, year 1872, \$100,000; Missouri River to Ohio River, year 1873, \$200,000; Ohio River to Illinois River, years 1874, 1878, \$440,000; Illinois River to Ohio River, years 1875, 1876, 1879, 1880, 1881, \$1,450,000; channel opposite St. Louis, Mo., year 1876, \$29,600; ice harbor at St. Louis, Mo., years 1880, 1881, \$60,000; Cape Girardeau and Minton Point, years 1880, 1881, \$30,000, aggregating-----

\$2, 409, 600. 00

Present project:

Aug. 2, 1882, Cairo to Illinois River-----	600, 000. 00
July 5, 1884, Illinois River to Ohio River-----	520, 000. 00
Aug. 5, 1886, Illinois River to Ohio River-----	375, 000. 00
Aug. 11, 1888, Illinois River to Ohio River-----	300, 000. 00
Sept. 19, 1890, harbor at St. Louis, Mo.-----	182, 000. 00
Sept. 19, 1890, Illinois to Ohio River-----	400, 000. 00
July 13, 1892, Ohio River to Missouri River-----	525, 000. 00
Mar. 3, 1893, Ohio River to Missouri River-----	658, 333. 33
Aug. 18, 1894, Ohio River to Missouri River-----	758, 333. 33
Mar. 2, 1895, Ohio River to Missouri River-----	758, 333. 33
June 3, 1896, Missouri River to Ohio River-----	275, 000. 00
June 4, 1897, Ohio River to Missouri River-----	673, 333. 33
June 4, 1897, preventing break in Mississippi River at Beech-ridge, Ill.-----	100, 000. 00
June 19, 1897, Ohio River to Missouri River-----	325, 000. 00
July 1, 1898, Ohio River to Missouri River-----	673, 333. 33
Mar. 3, 1899, Ohio River to Missouri River-----	673, 333. 33
June 6, 1900, Ohio River to Missouri River-----	100, 000. 00

Present project—Continued.

June 13, 1902, Ohio River to Missouri River-----	\$650,000.00
Mar. 8, 1903, Ohio River to Missouri River-----	650,000.00
Apr. 28, 1904, Ohio River to Missouri River-----	650,000.00
Mar. 8, 1905, Ohio River to Missouri River-----	650,000.00
Mar. 2, 1907, Ohio River to Missouri River-----	250,000.00
May 27, 1908, Ohio River to Missouri River-----	250,000.00
Mar. 4, 1909, Ohio River to Missouri River-----	250,000.00
June 25, 1910, Ohio River to Missouri River-----	250,000.00
June 25, 1910, Ohio River to Missouri River-----	500,000.00
Feb. 27, 1911, Ohio River to Missouri River-----	1,000,000.00
July 25, 1912, Ohio River to Missouri River-----	1,000,000.00
Mar. 4, 1913, Ohio River to Missouri River-----	1,000,000.00
Oct. 2, 1914, Ohio River to Missouri River-----	250,000.00
Mar. 4, 1915, Ohio River to Missouri River-----	800,000.00
July 27, 1916-----	850,000.00

Total of appropriations----- 18,806,599.98

Of the above total amount there was appropriated in the years 1836, 1837, and 1844, for pier near St. Louis and obstructions in harbor of St. Louis (not considered in previous project of 1872, nor existing project of 1881), the sum of----- \$75,000

By the acts of 1872, 1874, 1875, 1876, 1878, 1879, 1880, 1882, 1890, there was allotted for work above the mouth of the Missouri River (not in the present district) the sum of----- 205,000

From the appropriation of 1879 there reverted to the Treasury the amount allotted by the act for Wittenberg, Mo.----- 10,000

290,000.00

Leaving for work in the present district between the mouth of Missouri and Ohio Rivers, under general acts for work in the district and special acts for work at certain localities in the district----- 18,016,599.98

Receipts from sales----- 88,255.07

Available for work in district----- 18,104,855.05

CONTRACTS IN FORCE.

Name: Rust & Swift.

Work: Constructing 10,000 linear feet of river-bank protection.

Price per linear foot: \$12.50, approximately.

Date of approval: April 29, 1915.

Date of beginning work: May 10, 1915.

Date of expiration: December 31, 1915. Extended to December 31, 1916.

Percentage of completion: 40.

Name: O'Gara Coal Co., trustee.

Work: Furnishing 1,000 tons coal at St. Louis, Mo.

Price per ton: \$1.75 on cars.

Date of approval: February 7, 1916.

Date of beginning work: January 28, 1916.

Date of expiration: December 31, 1916.

Percentage of completion: 50.

Name: Southern Coal, Coke & Mining Co.

Work: Furnishing 5,000 tons coal aboard or alongside steamers and 15,000 tons coal on barges, at St. Louis, Mo.

Price per ton: \$1.70 aboard steamers, \$1.45 alongside steamers, and \$1.40 on United States barges.

Date of approval: February 19, 1916.

Date of beginning work: January 18, 1916.

Date of expiration: December 31, 1916.

Percentage of completion: 5.

Name: The Monongahela River Consolidated Coal & Coke Co. (Succeeded Jan. 10, 1916, by Pittsburgh Coal Co.)

2594 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Work: Furnishing aboard steamers 4,000 tons coal at Cairo; 1,500 tons at Memphis; 500 tons at Rosedale, Miss.; 1,000 tons at Vicksburg, Miss.; and 500 tons at Natchez, Miss.

Price per ton: \$2.20 at Cairo, Ill.; \$2.52 at Memphis, Tenn.; \$2.83 at Rosedale, Miss.; \$3.24 at Vicksburg, Miss.; \$3.84 at Natchez, Miss.

Date of approval: February 15, 1916.

Date of beginning work: January 3, 1916.

Date of expiration: December 31, 1916.

Percentage of completion: 15.

Name: West Kentucky Coal Co.

Work: Furnishing 1,000 tons coal aboard or alongside steamers at Greenville, Miss.

Price per ton: \$3.25 alongside steamers; \$3.50 aboard.

Date of approval: January 25, 1916.

Date of beginning work: January 17, 1916.

Date of expiration: December 31, 1916.

Percentage of completion: 45.

COMMERCIAL STATISTICS.

Season of navigation opened February 1, 1915, and closed December 23, 1915.

Arrivals and departures of steamboats and barges at St. Louis, Mo., during the calendar year 1915.

	Number.	Net tonnage.	Times arrived.
Steamboats.....	11	544-822	542
Do.....	12	335-495	474
Do.....	15	108-250	301
Do.....	7	60-95	
Total.....	45		1,326
Barges.....	2	680	7
Do.....	18	600	25
Do.....	1	200	1
Do.....	1	150	1
Do.....	1	100	1
Total.....	23		35

Passengers. 568,081.

Freight traffic for calendar year 1915.

Articles.	Short tons.	Approximate value.	Average distance freight was carried.	Ton-miles.
			Miles.	
Bauxite ore.....	15,314	\$107,964	184	2,515,732
Cement.....	7,271	61,236	200	1,454,200
Coal.....	89	178	16	1,490
Cotton.....	1,006	271,630	184	185,104
Cotton seed.....	2,729	70,964	184	502,136
Garbage.....	52,000	44,200	9	468,000
Grain and products.....	27,750	901,575	46	1,272,522
Groceries, etc.....	10,945	520,080	122	1,322,316
Iron, etc.....	7,657	302,280	44	336,422
Live stock and products.....	14,029	2,427,017	67	941,181
Logs.....	34,584	124,562	141	4,884,785
Lumber.....	4,030	151,200	131	527,474
Merchandise and sundries.....	59,462	8,919,300	134	7,965,544
Oil.....	21,835	101,124	109	4,380,544
Total.....	258,501	14,013,520		26,778,453

The reports indicate that there was a falling off of cement, coal, grain and products, groceries, logs, lumber, merchandise, and stone and brush in 1915 as compared with 1914; the increases being principally of bauxite ore, oil, and garbage, which were not transported in 1914.

The rates per ton-mile, as reported by transportation companies, varied from 2 mills to 9½ mills, depending upon upstream or downstream transportation and distance freight was carried.

Ferry traffic for calendar year 1915.

Articles.	Short tons.	Approximate value.	Average distance freight was carried.	Ton-miles.
			<i>Miles.</i>	
Automobiles.....	2,436	\$2,436,000	1	1,218
Brick.....	21	252	10	10
Chatts.....	290,592	101,707	145,296	145,296
Coal.....	2,589,531	5,179,032	1,289,785	1,289,785
Concentrates.....	77,912	3,272,304	38,956	38,956
Cotton.....	1	270	1	1
Grain and products.....	110,936	3,549,952	55,468	55,468
Groceries, etc.....	18,800	806,400	9,400	9,400
Iron, etc.....	49,031	1,961,240	24,516	24,516
Lime.....	24,243	133,337	12,121	12,121
Live stock and products.....	2,419	423,487	1,209	1,209
Logs.....	8,337	33,332	4,169	4,169
Lumber.....	160,430	4,107,500	80,215	80,215
Merchandise and sundries.....	654,124	9,812,000	327,067	327,067
Oil.....	61	281	30	30
Stone, etc.....	95,320	95,320	47,660	47,660
Vehicles, etc.....	23,763	7,128,900	11,881	11,881
Total.....	4,107,967	\$9,043,344	2,058,982	2,058,982
Sand, barged.....	592,788	136,465	1	870,530

Passengers, 456,221.

The reduction of ferry traffic in 1915, compared with 1914, was on account of changes being made in the landings or inclines of the principal ferry company at St. Louis, which prohibited the usual operation of the ferry transfers during the greater part of the year. Upon completion of the changes, transfer by river will be resumed.

Government materials transported.

Articles.	Short tons.	Approximate value.	Average distance freight was carried.	Ton-miles.
			<i>Miles.</i>	
Brush.....	23,836	\$38,231	12	277,010
Piles.....	3,530	24,045	92	324,700
Stone.....	84,440	43,049	41	3,474,858
Coal.....	12,924	24,900	63	1,301,900
Miscellaneous.....	707	32,148	88	62,800
Groceries.....	50	2,500	75	3,750
Lumber.....	2,632	87,742	35	92,172
Total.....	128,119	212,615	5,437,190	5,437,190

RECAPITULATION.

	Short tons.	Approximate value.	Ton-miles.	Passengers.
Freight traffic.....	258,501	\$14,013,520	26,778,453	568,081
Ferry traffic.....	4,107,967	\$9,043,344	2,058,982	456,221
Sand barged.....	592,788	136,465	870,530	.....
Government materials.....	128,119	212,615	5,437,190	.....
Total.....	5,087,375	\$23,405,944	35,145,155	1,024,302

Statistics of freight and ferry traffic, sand barged, and Government materials transported, compiled from reports of steamboat and sand companies, and official records.

The transportation of cement southbound from the Atlas Portland Cement Co.'s plant at Hannibal, Mo., was continued during the year, although the tonnage was less than that of the year 1914.

The transportation of oil to and from the Standard Oil Co.'s refinery at Woodriver, Ill., which had been discontinued in the year 1914, was resumed in 1915.

The Inland Navigation Co., which established a through transportation line between New Orleans, La., and St. Paul, Minn., in 1914, discontinued in 1915, but resumed in 1916, and it is their intention to add additional barges to their service.

The Chicago, St. Louis & Gulf Transportation Co., organized in 1915 to engage in transportation business between La Salle, Ill., and New Orleans, La., made several trips between the places stated.

The transportation of bauxite ore by river from the State of Arkansas to East St. Louis, Ill., for the manufacture of aluminum, was inaugurated in the year 1915.

The city of St. Louis has constructed at the foot of O'Fallon Street a temporary dock and warehouse 300 feet in length for exchange of freight between vessels and railroad cars or wagons. The city has plans under way for the construction of a similar temporary dock at the foot of Rutger Street, and for a permanent reinforced concrete dock, 440 feet in length, at the foot of North Market Street.

The reports of steamboat companies indicate that there were reductions in tonnage of grain and products, groceries, logs, lumber, merchandise, etc., in 1915 compared with 1914. The increases were principally of bauxite ore, oil, and garbage, which were not transported in 1914.

The lines of transportation in the district of the Mississippi River between the Ohio and Missouri Rivers during the calendar year 1915 were as follows: Plying north of St. Louis, Mo.: The Streckfus Steamboat Co., Wisherd Line, Independent Packet Co., steamer *St. James*, and the Kansas City-Missouri River Navigation Co. Plying south of St. Louis: Huntington & St. Louis Towboat Co., Lee Line steamers, Cape Girardeau Transportation Co., Blue Spot Towing Co., Farmers & Merchants' Transportation Co., steamer *Jno. S. Summers*, St. Louis & Tennessee River Packet Co., and Cumberland River Steamboat Co. Plying north and south of St. Louis: Northern Steamboat Co., Eagle Packet Co., Standard Oil Co., Atlas Transportation Co., Barrett Line, and the St. Louis Excursion Co., and Columbia Packet Co., the two latter carrying passengers only.

The rates per ton-mile reported by transportation companies varied from 2 mills to 9½ mills, depending upon upstream or downstream transportation and the distance freight was carried.

The published tariff rates per hundred pounds within the river district, depending on distances the freight was carried, were as follows:

Between St. Louis, Mo., and Cairo, Ill.: First class, 25 to 35 cents; second class, 20 to 30 cents; third class, 15 to 25 cents; fourth class, 10 to 18 cents; fifth class, 10 to 15 cents.

Between St. Louis, Mo., and Alton, Ill.: First class, 18 cents; second class, 15 cents; third class, 12 cents; fourth class, 10 cents; fifth class, 8 cents; and a "special stock tariff" applying from St. Louis to points on the Illinois River.

Total cost and work done to June 30, 1916.

HURDLES.

	New.	Restora- tion.	Re- pairs.	Cost.
	<i>Ltn. ft.</i>	<i>Ltn. ft.</i>	<i>Ltn. ft.</i>	
Prior to July 1, 1915.....	400, 281	35, 587	92, 054	\$8, 142, 036. 86
During fiscal year ending June 30, 1916:				
Sulphur Springs, Ill.....			625	6, 724. 75
Penitentiary Point, Ill.....			1, 050	22, 613. 40
Fort Chartres, west side.....			215	3, 126. 62
Sta. Genevieve, Ill.....			250	11, 742. 36
Crain Island, Mo.....	800		550	31, 799. 23
Liberty, Mo.....	300		160	21, 779. 86
Lacour Island, Ill.....		270		15, 323. 67
Union Point, Ill.....		280		8, 622. 13
Crawford, Mo.....			350	5, 000. 11
Hanging Dog Island, Ill.....			30	586. 95
Devils Island, Ill.....		190		3, 886. 82
Total.....	401, 381	36, 327	95, 284	8, 273, 252. 76

Total cost and work done to June 30, 1916—Continued.

BANK PROTECTION.

	Mattress.			Paving.		
	New.	Repairs.	Cost.	New.	Repairs.	Cost.
Prior to July 1, 1915.....	<i>Ltn. ft.</i> 344,581	<i>Sq. ft.</i> 41,764,865	<i>Sq. ft.</i> 4,363,606	<i>Sq. ft.</i> 20,240,374	<i>Sq. ft.</i> 5,822,235	\$2,523,463.53
During fiscal year ending June 30, 1916:						
Sulphur Springs, Ill..	1,380	130,720	96,220	27,575	71,115	11,625.93
Fort Chartres, west side.....					7,020	1,223.36
Fort Chartres, east side.....					38,655	4,318.48
Turkey Island, Ill.					21,450	2,453.92
Kaskaskia Island, Ill.	3,663	409,106		280,125		14,714.58
Craft Island, Mo.				9,875		1,681.99
Wilkinson, Ill.	1,135	145,280	6,400	49,600	12,500	11,002.25
Hanging Dog Island, Ill.					2,925	970.14
Devils Island, Ill.		37,845	6,474.63		67,535	12,723.42
Price Landing, Mo.		44,200	4,924.08		37,875	8,649.90
Eliza Towhead, Ill.	735	116,600	15,200	36,530	6,950	8,359.08
Cairo Protection, Ill.					5,560	547.70
Greenfield Bend, Mo.	1,305	202,060	52,700	4,500	20,650	6,906.02
Total.....	352,949	42,840,230	4,646,170	20,648,579	6,114,770	2,608,669.39

RECAPITULATION.

Bundies.....	\$8,273,252.76
Bank protection.....	5,182,802.54
Dikes and dams.....	691,893.46
Jetties.....	114,603.53
Dredging.....	1,999,809.01
Surveys.....	374,332.04
Total.....	16,638,743.34

PROPERTY.

	Value, July 1, 1915.	Debits.	Credits.	Value, June 30, 1916.
Steamers:				
Gen. J. H. Simpson.....	\$9,150.00	\$11,704.98	\$13,854.98	\$7,000.00
Wm. R. King.....	43,650.00	8,342.89	9,992.89	42,000.00
Dredges:				
Selma.....	54,000.00	5,470.92	5,470.92	54,000.00
Thebes.....	54,000.00	516.53	3,516.58	51,000.00
Fort Gage.....	124,000.00	24,937.21	30,937.21	118,000.00
Fort Chartres.....	124,000.00	17,761.33	25,761.33	116,000.00
Tenders:				
Cahokia.....	2,800.00	883.71	3,683.71	.....
Isle de Bois.....	1,500.00	107.10	707.10	900.00
Aux Vases.....	1,500.00	392.59	992.59	900.00
Salvini.....	8,100.00	2,612.20	3,212.20	7,500.00
Kaskaskia.....	8,100.00	2,233.73	2,933.73	7,500.00
Meramec.....	9,000.00	1,859.67	2,459.67	8,400.00
Barges:				
Model (23).....	32,000.00	1,113.17	14,113.17	19,000.00
Steel (25).....	227,500.00	1,188.93	13,686.93	215,000.00
Flat (1).....	607.00	6.50	331.50	275.00
Store boats (2).....	3,170.00	101.77	571.77	2,700.00
Quarter boats (10).....	82,400.00	478.30	7,178.30	25,700.00
Office and survey boats (5).....	11,000.00	79.71	2,079.71	9,000.00
Pile drivers:				
Wood (14).....	31,500.00	1,943.34	7,443.34	26,000.00
Steel (4).....	29,000.00	808.35	2,808.35	27,000.00
Derrick boats, wood (2).....	4,800.00	116.12	1,016.12	3,700.00
Grader and derrick boats, steel (2).....	23,600.00	1,348.33	2,648.33	22,300.00
Derricks (2).....	3,150.00		450.00	2,700.00
Machine boat (1).....	450.00		380.00	90.00
Flats:				
Wood (52).....	2,775.00	1,264.48	1,699.48	2,340.00
Steel (63).....	71,000.00	673.34	4,673.34	67,000.00

Total cost and work done to June 30, 1916—Continued.

PROPERTY—Continued.

	Value, July 1, 1915.	Debits.	Credits.	Value, June 30, 1916.
Small boats:				
Wood (71).....	\$785.00	\$369.85	\$404.85	\$850.00
Steel (18).....	590.00	8.67	73.67	465.00
Portable quarters.....	235.00		85.00	200.00
Engineer depot.....	10,650.00	3,800.59	5,300.59	9,250.00
Tools and appliances.....	20,760.00	6,548.27	8,108.27	19,200.00
Boarding outfit.....	14,620.00	1,195.43	3,265.43	12,550.00
Office furniture.....	1,720.00	222.40	332.40	1,610.00
Survey instruments.....	1,380.00	4.60	209.60	1,175.00
Total.....	963,225.00	97,998.06	180,113.06	881,105.00

MATERIAL.

Subsistence.....	\$1,252.27	\$29,955.84	\$30,381.11	\$327.00
Brush.....		15,079.62	15,079.62	
Piles.....	14,430.00	9,615.42	20,385.42	3,660.00
Stone:				
United States quarry.....		2,472.40	2,472.40	
Purchased.....	2,023.40	36,584.48	36,537.88	2,070.00
Rope.....	10,063.00	4,529.45	5,374.45	9,217.00
Wire.....	754.00	1,475.26	2,008.26	221.00
Iron.....	12,780.00	2,534.08	2,855.08	12,439.00
Nails.....	1,035.75	5.66	332.41	709.00
Spikes.....	677.70	27.50	100.20	605.00
Lumber:				
Miscellaneous.....	5,377.00	942.36	2,043.36	4,276.00
Mattress.....		2,761.96	2,761.96	
Oakum.....	567.00	5.25	95.25	477.00
Coal.....	1,406.00	23,345.66	23,322.66	1,519.00
Ice.....		1,139.66	1,139.66	
Material, miscellaneous.....	13,914.41	12,636.83	14,524.24	12,027.00
Total.....	64,349.53	143,111.43	159,413.96	48,047.00

2. REMOVING SNAGS AND WRECKS FROM THE MISSISSIPPI RIVER BELOW THE MOUTH OF THE MISSOURI RIVER AND FROM OLD AND ATCHAFALAYA RIVERS.

This work is now being done by two large steel-hull snag boats—*J. N. Macomb* (built 1874) and *H. A. Wright* (built 1881)—fitted with all necessary tools and appliances and operated by hired men, which patrol the river for 1,300 miles between the mouth of the Missouri River and the mouth of Red River and Melville, La., on the Atchafalaya, and Head of Passes on the Mississippi.

Descriptions of these boats will be found in the Annual Report of the Chief of Engineers for 1895, page 2054 et seq.

OPERATIONS.

At the beginning of the fiscal year both snag boats were laid up in ordinary, the *Macomb* at St. Louis, Mo., and the *Wright* at Vidalia, La., awaiting a river stage low enough to resume snagging operations.

The *Macomb* began active operations September 3, made two round trips to Melville, La., on the Atchafalaya, one of which was from Memphis, Tenn.; reached St. Louis March 17 and returned to

Memphis April 6. The *Macomb* was docked April 8 at the marine ways of the Mississippi River Commission at West Memphis, Ark., for repairs to the frames and plating of the bows; was launched May 19; returned to St. Louis June 14, and was then laid up in ordinary to the end of the fiscal year.

The *Wright* left Vidalia, La., September 15; arrived at St. Louis October 16; made one round trip to Memphis, Tenn., and one to Melville, La., on the Atchafalaya; lay at Greenville, Miss., from December 31 to February 16, during the passage of a high river stage, and returning to St. Louis April 15, was then laid up in ordinary during the spring season of high water, when snagging was not required, to the end of the fiscal year.

Name.	Snags destroyed.	Trees cut.	Drift piles removed.	Wrecks destroyed.	Miles traversed.
J. N. Macomb.....	1,673	.....	6	9	4,357
H. G. Wright.....	832	221	13	7	4,272
Total.....	2,505	221	19	16	8,629

WORK UPON WRECKS AND SUNKEN VESSELS.

The *Macomb*, November 24-27, 1915, at Millikens Bend, Miss., recovered five oil tanks lost from sunken barge and destroyed wrecks of barges as follows: November 18, 1915, Carthage Point, Miss.; December 24, 1915, Graysboro, Mo. (two); March 28, 1916, Chain of Rocks, Mo.

The *Wright*, March 30, 1916, destroyed wreck of bridge false work below Four Mile Bayou, Ark., and destroyed wrecks of barges, as follows: October 18, 1915, Chouteau Island, Ill.; October 30, 1915, Chute of Island 26, Tenn.; December 13, 1915, Carthage Point, Miss.; December 20, 1915, Bruinsburg Towhead, Miss.; December 22, 1915, Yucatan Bend, Miss.; March 23, 1916, Home Landing, Miss.

In February, 1916, during the flood in the lower Mississippi River, both snag boats were held in readiness to assist, if necessary, in distributing provisions to the flood sufferers and rescuing men, women, and children, and live stock; and the *Macomb* was for a short time engaged in this work between Commerce, Mo., and Cairo, Ill. On February 14 the *Macomb* took the congressional Committee on Flood Control on inspection of the levees in the vicinity of Cairo, and the *Wright*, on February 18, conveyed this committee from Vicksburg, Miss., to Natchez, Miss.

The headquarters of the snag boats is in St. Louis.

It is proposed during the coming year to continue operating these boats as provided in the river and harbor act of August 11, 1888.

The work done is of great benefit to the commerce and navigation on the river. Before the river was so completely patrolled as it now is the sinking of steamboats and other river craft by running on snags was of common occurrence. During recent years such disasters have seldom occurred. Although life and property would seem to

be much safer on the river than formerly, the rate of marine insurance has not materially decreased.

APPROPRIATIONS.

The appropriations from the beginning of the work to the year 1878 were made in lump sums, usually under the titles of "Improvement of the Mississippi, Missouri, and Arkansas Rivers," and were applied to the several streams as their needs or as the terms of the laws required. Appropriations from 1879 to 1888 were specifically made or allotted for this work; in the latter year, August 11, expenditure of an amount not to exceed \$100,000 annually was authorized, under which act the work has been prosecuted ever since.

Appropriations (as shown on p. 494, H. Doc. No. 1491, 63d Cong., 3d sess., to which is added approximated amount expended previous to Mar. 3, 1879, from appropriations for Mississippi, Missouri, and Arkansas Rivers, p. 496, H. Doc. No. 1491, 63d Cong., 3d sess.):

Previous to Mar. 3, 1879 (approximated)-----	\$358,627.35
Mar. 3, 1879-----	100,000.00
June 14, 1880-----	100,000.00
Mar. 3, 1881-----	80,000.00
Aug. 2, 1882-----	85,000.00
July 5, 1884-----	¹ 72,950.63
Aug. 5, 1886-----	56,250.00
Aug. 11, 1888-----	100,000.00
Fiscal year ending June 30—	
1890-----	49,089.17
1891-----	92,720.97
1892-----	98,250.00
1893-----	96,497.23
1894-----	88,252.46
1895-----	100,000.00
1896-----	80,496.26
1897-----	83,421.64
1898-----	88,917.74
1899-----	88,923.15
1900-----	86,355.29
1901-----	86,710.05
1902-----	93,055.27
1903-----	72,587.48
1904-----	88,245.25
1905-----	81,822.81
1906-----	85,662.36
1907-----	85,669.59
1908-----	97,889.35
1909-----	100,021.06
1910-----	96,782.04
1911-----	103,157.94
1912-----	97,978.58
1913-----	101,442.43
1914-----	99,856.30
1915-----	99,953.11
1916-----	93,622.20
Total-----	3,390,207.68

¹ From the appropriation of \$75,000, July 5, 1884, only \$72,950.63 was expended.

Table of amount expended and work done in removing obstructions in Mississippi River between mouth of Missouri River and New Orleans, La., and from Atchafalaya and Old Rivers, from Mar. 28, 1868, to June 30, 1916.

Year.	Amount expended.	Work done.			
		Snags destroyed.	Trees cut.	Drift piles destroyed.	Wrecks destroyed.
Mar. 28, 1868, to June 30, 1871.....		3,271	37,438	30	
Fiscal year ending June 30—					
1872.....		1,365	2,621	12	
1873.....	\$46,901.40	1,365	1,713	5	
1874.....	72,802.80	680	515	5	
1875.....	70,727.01	1,461	2,984	14	
1876.....	49,854.30	1,213	1,539	5	1
1877.....	86,220.08	676	403	4	
1878.....	20,122.54	899	3,846	1	
1879.....	121,820.16	1,133	2,680	5	
1880.....	74,988.94	1,822	60	19	
1881.....	102,308.43	1,067	647	6	
1882.....	75,811.29	1,909	4,968	32	
1883.....	69,540.59	2,776	26,297	34	
1884.....	18,390.48	968	4	3	
1885.....	45,896.47	1,622	18,800		
1886.....	20,047.71	688	567		
1887.....	43,583.12	2,080	5,309	10	
1888.....	17,302.29	1,798	348		
1889.....	67,611.37	1,864	9,102	34	8
1890.....	49,039.17	2,861	12,112	23	1
1891.....	92,720.97	3,450	21,316	37	
1892.....	96,250.00	3,389	20,571		
1893.....	96,497.23	2,946	8,214	16	
1894.....	88,252.46	3,057	22,861	19	6
1895.....	100,000.00	3,307	17,520	22	3
1896.....	80,496.26	2,979	19,648	11	1
1897.....	83,421.64	3,072	31,014	24	2
1898.....	88,017.74	4,253	14,856	32	3
1899.....	88,928.15	3,300	30,695	34	
1900.....	86,355.29	4,479	15,170	19	
1901.....	86,710.05	3,595	19,748	28	
1902.....	92,055.37	3,907	28,570	27	7
1903.....	72,587.43	1,552	6,896	2	
1904.....	88,245.25	4,654	17,034	18	2
1905.....	81,822.81	4,118	16,241	19	12
1906.....	85,062.36	2,564	14,478	16	
1907.....	85,669.59	3,389	2,772	23	7
1908.....	97,889.35	3,744	5,175	19	6
1909.....	100,021.03	4,528	2,406	27	28
1910.....	96,782.04	3,245	2,571	17	23
1911.....	103,157.94	3,823	784	6	21
1912.....	97,978.58	1,517	1,698	11	14
1913.....	101,442.43	2,824	1,677	11	17
1914.....	99,856.30	4,487	2,194	27	22
1915.....	99,953.11	3,591	3,109	31	18
1916.....	93,622.20	2,505	221	19	16
Total.....	3,390,207.68	118,356	459,274	768	212

Amount expended during the fiscal year was \$98,622.20. Statement of this expenditure, as required by law, is given in the accompanying table showing the summary of expenses of operating the snag boats.

2602 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Summary of cash expenditures in connection with the work of removing obstructions in Mississippi, Atchafalaya, and Old Rivers during the fiscal year ending June 30, 1916.

Application.	For fiscal year 1915.	1915					
		July.	August.	September.	October.	November.	December.
General expense.....			\$500.67		\$8.79		
Office expenses.....	\$1.79	\$252.00	\$12.95	\$240.75	4.90	\$201.19	\$8.32
Expenses of snag boat H. G. Wright:							
Crew.....		2,389.00	2,397.00	2,408.83	2,406.84	2,436.80	2,412.30
Outfit.....		117.36					4.30
Fuel.....	675.78	350.79	306.27	873.30	645.40	628.83	1,681.06
Subsistence.....		\$18.55	716.70	\$13.19	\$02.91	\$73.58	\$72.00
Supplies.....		7.15		15.22	20.63		2.00
Repairs.....	\$12.93			26.00	38.20	3.60	306.20
Miscellaneous.....	10.06	2.30			3.42		
Expenses of snag boat J. N. Macomb:							
Crew.....		1,890.84	1,929.16	2,405.00	2,371.67	2,311.00	2,428.30
Outfit.....		25.90					4.30
Fuel.....	245.51	28.34	19.83	743.21	938.34	859.08	1,058.05
Subsistence.....		281.67	184.69	823.68	468.92	278.45	\$72.55
Supplies.....			11.87	11.16			
Repairs.....	416.41	7.27	28.36		22.54		\$16.36
Miscellaneous.....	3.43				3.43		
Total.....	2,165.91	5,680.26	6,407.50	7,880.34	7,444.08	7,582.70	9,470.80

Application.	1916						
	January.	February.	March.	April.	May.	June.	Total.
General expense.....	\$17.58	\$17.58	\$17.82	\$28.94	\$2.28		\$96.20
Office expenses.....	345.54	468.86	327.39	1,340.02	636.90	\$473.92	4,614.43
Expenses of snag boat H. G. Wright:							
Crew.....	2,113.62	1,914.00	2,029.00	2,058.83	2,062.17	2,073.83	26,622.12
Outfit.....				39.29	709.47	151.43	1,022.05
Fuel.....	223.94	517.64	1,456.31	230.16			7,696.35
Subsistence.....	633.56	572.74	127.74	608.67	448.67	596.64	6,148.04
Supplies.....	9.80	56.86		224.05	377.21	55.03	777.95
Repairs.....	3.00			738.79	564.49	925.87	3,518.87
Miscellaneous.....	70.83	23.11	18.75	20.14	3.66	2.43	154.89
Expenses of snag boat J. N. Macomb:							
Crew.....	2,014.99	1,841.00	1,926.32	2,146.42	2,494.81	1,931.50	25,690.21
Outfit.....				336.31	1,067.77	49.73	1,454.81
Fuel.....	214.25	241.78	419.49	57.05	588.13	8.80	5,432.14
Subsistence.....	314.68	382.94	245.43	1,022.50	519.13	264.74	5,779.38
Supplies.....	127.89			322.69	184.22	57.30	715.13
Repairs.....	116.38	8.85	229.22	1,455.46	402.92	264.42	3,268.19
Miscellaneous.....	32.64	12.38	3.02	12.62	43.97	11.62	123.11
Total.....	6,338.50	6,057.74	6,799.49	10,602.94	10,105.50	7,016.44	93,622.20

RECAPITULATION.

Fiscal year 1915 (paid in 1916).....	\$2,165.91
Fiscal year 1916.....	91,456.29
Total.....	93,622.20

COMMERCIAL STATISTICS.

The statistics relating to the commerce benefited by the operation of these boats will be found in the reports of operations for this year by this office for the improvement of the Mississippi River from the mouth of the Ohio to the mouth of the Missouri, and by the Mississippi River Commission and the district offices thereunder, the patrol of the snag boats extending through all these engineer districts.

IMPROVEMENTS OF RIVERS AND HARBORS IN THE ROCK ISLAND, ILL., DISTRICT.

REPORT OF MAJ. GEORGE M. HOFFMAN, CORPS OF ENGINEERS.

IMPROVEMENTS.

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1. Mississippi River between Missouri River and Minneapolis, Minn.....	2603	4. Operating snag boats and dredge boats on upper Mississippi River and tributaries.....	2628
2. Operating and care of lock and dry dock at Keokuk, Iowa (formerly Des Moines Rapids Canal).....	2626	5. Operating and care of Galena River improvement, Ill.....	2630
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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1090 TO 1103.

1. MISSISSIPPI RIVER BETWEEN MISSOURI RIVER AND MINNEAPOLIS, MINN.

GENERAL IMPROVEMENT.

St. Paul to Winona (122 miles).—This division is divided into three sections—Lock No. 1 to Omaha Bridge (6½ miles), Omaha Bridge to foot of Lake Pepin (77 miles), and Lake Pepin to Winona (39 miles).

1. *Lock No. 1 to Omaha Bridge.*—Hydraulic dredge *Pelee*, with triple crew, resumed operations on the 100-foot cut along Pike Island August 11, 1915, and completed it October 26. She then, until close of season, redredged 1,615 feet of the cut made in 1914, which had filled up considerably with débris from broken cofferdam at Lock No. 1. On November 3 dredge was laid up for the winter at South Stillwater. In this work the *Pelee* removed 94,815 cubic yards of gravel and sand at a cost, including all charges, of \$14,078.54, or 14.85 cents per yard.

Dipper dredge *Davenport* was employed on the 80-foot pilot cut leading to Lock No. 1, from September 24 to November 16, when the cut (1,910 feet) was completed and plant laid up at the lock. She dredged and removed 55,578 cubic yards, mostly gravel, at a cost, including all charges, of \$9,514.83, or 17.1 cents per yard. Operating cost, 10 cents per yard. The west half of the spoil was cast on shore and the remainder was dumped along shore, at various points, for shore protection.

In 1916 dipper dredge *Davenport* resumed operations in dredging the 6-foot channel in vicinity of the Omaha Bridge. On June 19 the dredge removed an old pier about 1,200 feet above the bridge and during the remainder of the month was employed at Minnehaha Creek and in the bend above Fort Snelling. During May and June the total spoil was 30,808 cubic yards of mud, gravel, and sand, the latter predominating.

2. *St. Paul to Lake Pepin*.—Hydraulic dredge *Pelee*, with triple crew, was employed in deepening the channel in vicinity of Grey Cloud Landing from May 11, 1915, to August 6, when she was transferred to Pike Island. She removed at this locality 85,426 cubic yards loose rock, gravel, and sand, at a cost, including all charges, of \$14,401.96, or 16.86 cents per yard.

Dipper dredge *Davenport* was employed from May 4 to September 23 in deepening the channel in vicinity of Grey Cloud Landing in hard bottom. A part of the material dredged was cast on shore, covering the existing shore protection and extending it upstream 1,300 feet; the remainder was loaded in dumps and mostly used in the extension and raising of dams, a part, however, being wasted between dams. Nine spur dams were extended from 60 to 190 feet, the extensions being raised to an elevation of 2 feet above low water. The material thus used (30,605 cubic yards) was very heavy and will probably largely remain in place, whereby a saving of 9,954 cubic yards of rock and brush will be made. In this work the *Davenport* dredged 125,340 cubic yards of material at a cost of \$21,133.90, or 16.8 cents per yard, including all charges.

From May 10 to 29 a hired labor plant was engaged at Grey Cloud in completing dams built the previous winter. In these dams, 5 in number, there were used 1,998.3 cubic yards rock and 6,204.2 cubic yards brush, at a cost, including all charges, of \$1.082 per yard. Material purchased in open market, rock 76 and brush 29 cents per cubic yard.

No field or construction work was done in this section in 1916 prior to July 1.

Junior Engineer N. B. Gosline is in charge of dredging operations above and below St. Paul.

3. *Lake Pepin to Winona*.—Hired labor work in construction and repair of dams and shore protections by hired labor in accordance with the 6-foot project was resumed June 3, 1915, in vicinity of Teepeeota (mile 84) and carried on down river to September 17, when the plant was transferred to Pine Island and Belvidere (miles 91-94), where it operated until November 4, when it was placed in winter quarters in Fountain City Bay. The towing was done by the *Fury*, *Ada*, and *Minneapolis*. Materials purchased in open market: Rock 87, 88, and 95 cents; brush, 25.3, 25.8, 26.5, 27, and 28 cents per cubic yard. Twelve dams were built (5,035 linear feet), 27 dams extended (3,430 linear feet), 27 dams were repaired, and 1 piece of shore protection extended 600 feet. The cost of above work (92,766.9 cubic yards), including all charges, was \$99,935.37, or \$1.077 per cubic yard.

Hydraulic dredge *Taal* was employed with single crew from September 2 to October 28 in pumping foundations for dams and ex-

NOTE.—The origin of miles is the Omaha bridge at St. Paul.

tensions with variable success, the cost of which dredging (70,125 cubic yards) was \$9,229.15.

No field or construction work was done in this section in 1916 prior to July 1.

Construction of dams and shore protections below Lake Pepin is in charge of Assistant Engineer J. D. Du Shane.

Winona to Wisconsin River (95 miles).—During the open season of 1915 in this division, in charge of Assistant Engineer W. A. Thompson, the construction and repair of dams and shore protections were carried on by hired labor from July 9 to November 8 between Trempealeau and Brownsville (miles 128–153) and in vicinity of Crooked Slough (miles 188–191). The towing was performed by *Alert* and *Elsie*, which, together with the remainder of the plant, were laid up a part in Black River and the remainder in Fountain City Bay. Materials were purchased in open market: Rock at 78.4 and 74.4, brush at 21.75, 21.8, and 27 cents per cubic yard. The United States quarry at La Moille furnished, on barges, 16,655.1 cubic yards of rock at \$1.022 per cubic yard. This quarry was discontinued at end of season and machinery and equipment were removed to Fountain City for storage, a portion of which salvage has been sold. During the season five spur dams were built (2,240 linear feet), three closing dams (642 feet), two L dams (685 feet), and six spur dams were lengthened (2,205 feet). Seven dams were repaired and 1,725 linear feet of shore protection was built. There were put in place in above work 71,381.5 cubic yards material at a cost, including all charges, of \$77,406.14, or \$1.084 per yard.

The 6-foot improvement is now completed from Winona to La Crosse.

In January and February, 1916, winter work of a similar character was performed at various points in this division, as described in a special report.

All of the dams in this division were built to a crest elevation of 4 feet.

Surveys were made above Brownsville, from Brownsville to Genoa, at Lansing, and foot of Crooked Slough.

At the United States boat yard at Fountain City repairs were made in 1915 to towboats *Alert*, *Elsie*, and *Ada*, 8 motor skiffs, 1 launch, dredges *Apache* and *Taal*, 3 quarter boats, 2 inspection boats, 1 store boat, 1 office boat, 1 building boat, 2 grasshoppers, 4 fuel barges, 31 barges, 35 pontoons, and 21 skiffs. There were built 1 barge, 1 building boat, 3 coal flats, and 4 skiffs.

No dredging was done in this division.

No field or construction work was done in this division in 1916 prior to July 1, other than that on the ice in January and February, elsewhere reported under the head of "Winter work."

Wisconsin River to Le Claire (136 miles).—Operations in this division, in charge of Assistant Engineer S. Edwards, were performed by hired labor and use of Government plant, and also by contract and agreements. The hired labor plant, with towboats *Elinor* and *Louise* began operations in building dams and shore protections June 17, 1915, and returned to Dubuque Ice Harbor for the winter November 18. Hydraulic dredge *Etna* aided the construc-

tion of dams by pumping sand which materially reduced their cost, as shown in another report. Materials were purchased in open market, rock at 78, 83, 84, and 85, brush 20, 24, and 27 cents per cubic yard. Work was carried on in the vicinity of Wyalusing (miles 214-215) and from Parsons Bar to Dubuque (miles 255-262). Sixteen spur dams were built (14,820 linear feet) and 2 were extended (725 linear feet). Four pieces of shore protection, with lumber mat, were constructed (8,100 linear feet). The cost of this work, not including the dredge fill, was \$85,121.86, or \$0.931 per cubic yard. Lumber (127,640 feet b. m.) was commuted to brush at the rate of 53.665 cubic yards per thousand feet.

The permanent crest elevation of dams in this division is 4 feet above low water. Winter work in January and February, 1916, is mentioned in a special report. Small repairs were made to floating plant at Dubuque, and surveys were made in vicinity of Wyalusing and from Savanna to Le Claire.

Under formal contract with Kirchner Contracting Co., dated December 7, 1914, at \$1.55 for rock and \$0.65 for brush per cubic yard in place, similar work on dams and shore protections at various localities (miles 234-249) was performed. Six dams were repaired, 1 extended 150 feet and 11 built (6,425 linear feet). There were put in place 13,333.3 cubic yards rock and 26,666.7 cubic yards brush at a cost including all charges of \$0.9985 per yard. Work on above contract was begun April 8, 1915, and completed August 20.

Under formal contract with the same company, dated August 26, 1915, at \$1.55 per cubic yard for rock and \$0.63 for brush in place, work was begun August 16 and completed October 20. Between Buena Vista and Spechts Ferry (miles 238-251) there were built under this contract one piece of shore protection and one spur dam were repaired, three spur dams completed and five built, as also 4,310 linear feet of shore protection. There were put in place 14,875.4 cubic yards rock and 29,751 cubic yards brush at a cost of \$43,295.05, or \$0.97 per cubic yard.

Under informal agreement with the same company, dated October 12, 1915, at \$1.55 for rock and \$0.63 for brush per cubic yard, 1,880 linear feet of shore protection was built on Island 200 at a cost of \$6,780.59, or \$1.14 per cubic yard, or \$3.58 per linear foot.

No work was done in this division in 1916 prior to July, except work on the ice in January and February, elsewhere reported under the head of "Winter work."

Rock Island Rapids (miles 348-362).—Work in this division in charge of Asst. Engineer. J. B. Bassett was performed by hired labor and use of Government plant.

Rock excavation at lower chain (open-channel work).—The work in open channel consisted in sweeping for loose rock a portion of patch No. 3 which had been dredged in the fall of 1914, in order to widen the deep water channel. With this work accomplished the width of channel, with 6 feet or more depth at low water, was about 170 feet. This work was done by towboat *Grace* assisted by derrick boat *No. 297* between April 5 and 19, 1915. Area swept was approximately 1,350 feet long by 80 feet wide and the cost \$3,489.62.

Le Claire Canal project.—When the project for the 6-foot channel for the Mississippi River between the mouth of the Missouri and

Minneapolis was in preparation it was decided that a lateral canal was preferable to further deepening of the existing open-channel improvement, which provided a 4-foot depth on the upper section of the Rock Island Rapids from Hampton Pool to Le Claire. Maps for a lateral canal had been prepared by a board of engineer officers in 1888, and an estimate, with these maps as a basis, was made and included in the project without further investigation of the question of location with reference to the Illinois or Iowa side of the river.

After the adoption of the 6-foot channel project the question of location was again taken up, resulting in the approval of a location on the Iowa side for the following reasons:

1. Canal on Iowa side will be one-half mile shorter.
2. Longitudinal dike will be extended downstream to head of Smiths Island only, the latter with some inexpensive diking serving as the canal wall. This saves nearly a mile of dike.
3. Canal without a guard lock will be constructed with a wider 6-foot waterway than would be possible on Illinois side, favoring a higher boat speed.
4. Construction on Illinois side would encroach on the open channel to some extent, which would have to be restored on the outside of the canal wall at a very large expense for rock excavation.
5. The upper end of canal will now be on the Iowa side, which will obviate an extra crossing of river and also provide an entrance less exposed to moving sand bars than on the Illinois shore.
6. Estimates of cost show canal on Iowa side will be more economical.

Description.—The improvement is known as the Le Claire Canal. It will be formed by a longitudinal dike or wall, beginning at the upper end of the Rock Island Rapids, just below Le Claire, Iowa (mile 349), and extending downstream roughly parallel to the Iowa shore to the head of Smiths Island. The island then takes the place of the dike with the channel between the island and the Iowa shore. It will terminate in a lift lock and closing dam at the lower end of the island. The total length is about $3\frac{1}{2}$ miles.

The longitudinal wall will be constructed to a height of a 6.5-foot stage in the river at the head of the canal on a level for a distance of approximately 2 miles. It will then be raised above high water for the remainder of the distance to the head of Smiths Island (about one-half mile). The upper portion will act as a spillway and will be protected from erosion by a concrete apron. Some inexpensive levee construction will be necessary on Smiths Island.

The lock will lie next to the Iowa shore with a closing dam of puddled fill and riprap connecting with the lower part of the island. It will have chamber dimensions of 80 feet width and 350 feet length to correspond with existing locks at Moline and Minneapolis. The maximum lift will be about 6 feet at low water. Miter gates will be used, operated by electrical machinery.

Rock excavation in the canal prism will be necessary along the upper 2 miles. Immediately above the lock some excavation will be made on shore points to straighten the channel.

Subaqueous excavation in both upper and lower approaches is included in the project.

The preliminary estimate of cost, with the rejected item for culvert construction omitted, is as follows:

Canal:		
Cofferdam, 14,700 feet	\$239,315	
Prism excavation—rock, 151,775 cubic yards	178,700	
Straightening channel, 75,180 yards	53,130	
Concrete on longitudinal dam	74,130	
Removing temporary and cross cofferdam	2,540	
		\$547,815
Lock:		
Cofferdams, 1,205 linear feet	19,090	
Excavation, 12,210 cubic yards	13,615	
Concrete in walls, sills, etc., 16,222 cubic yards	97,332	
Lock gates	39,500	
Valves, operating machinery, emergency gates, and accessories	26,001	
Back filling	17,424	
Guide walls, booms, etc.	40,836	
Office, shops, and dwellings	11,875	
		285,673
Closing dam		8,435
Levee on Smiths Island		4,948
Power house		11,445
Excavation in approaches:		
Upper, 27,460 cubic yards	118,078	
Lower, 58,460 cubic yards	94,614	
		212,692
Right of way and fencing		17,990
Total		1,068,998
Add 20 per cent for contingencies		213,799
Total estimate		1,282,797

The construction plan contemplates the excavation of rock in the upstream portion of the canal prism and the building of the longitudinal wall down to the head of Smiths Island. This work to be followed by the construction of lock, closing dam, and channel straightening at the lower end. The subaqueous excavation in approaches is to be done whenever plant is available and sufficient funds are on hand.

The first funds for construction purposes were allotted from act of October 15, 1914, and work was commenced on the erection of a camp for housing employees on rented property about 1 mile downstream from the town of LeClaire, Iowa.

A sidetrack connecting with the Davenport, Rock Island & Northwestern Railway was built and purchase of materials begun. A well for water supply was drilled and pumping apparatus and pipe line connected. Buildings for office, mess, barracks, warehouse purposes, etc., were gotten under way. Materials for yard tracks and for about 3,000 linear feet of cofferdam were received. The above work was accomplished during the calendar year 1914.

In general, the camp is supplied with electric power for lighting, operation of saws and boring tools for framing lumber, and for pumping the water supply for the camp. Sanitary water-closets and washhouses, including a sewer system, are supplied for the use of the entire working force.

Operations during 1915 are as follows:

Le Claire Canal—General.—The work in general consisted of the completion of camp buildings (partially erected in 1914), installa-

tion of water supply from driven well, sewers, shop equipment, and saw equipment for framing lumber; the receipt of cofferdam materials and general construction plant.

Connection was made, under contract, with the electric power lines of the Iowa & Illinois Railway Co., and power was used to operate the camp water-supply pump, the saw and boring machine for framing lumber and the electrical pump for unwatering cofferdam and for lighting the camp buildings.

The Rock Island Rapids fleet, consisting of towboats *Ruth* and *Grace*, derrick boats 319 and 297, dipper dredge *St. Paul*, drill boat 426, and two spud boats, with accompanying quarter boats, store boat, and barges were taken from Moline Pool winter quarters in April and towed to Le Claire, Iowa, to assist in cofferdam construction. Later in the season the fleet was augmented by one building boat, one spud boat, and one derrick boat, the new towboat *Le Claire*, the dredge *Keokuk*, and five barges.

The construction of the cofferdam was commenced on May 1, and was completed, including filling to grade, in November. A total of 8,680 linear feet was constructed. The work was delayed to a large extent during the month of July by an unexpected high stage of the river. During this month there were three partial collapses of the dam; the first while being filled, and the other two at the extreme lower end of the construction when sheathing was in progress. In each case additional anchor bolts in the river bed and holding cables had to be set before the sections could be righted so that work could proceed. In September two breaks occurred in completed but partially filled dam, both coincident with a sharp rise in the river stage which raised water in the dam to an elevation at or above the filling. The first was due to water pressure alone and the latter to water pressure helped by the accidental striking of the dam by the towboat *Le Claire*. Both breaks were satisfactorily repaired, but two to three weeks delay was incurred thereby.

Owing to the nondelivery of a pump and motor from the contractor the suction dredge *Geyser* was brought from Moline Pool and placed at the lower end of the cofferdam structure, and on October 25 commenced the unwatering of the cofferdam area. With the help of some ditching to allow water to reach the *Geyser* intake pipe, the water level inside of pit was lowered to an elevation of 6.6 feet below low water in pit. This level was maintained until the electric pump, received about December 1, was installed and started pumping on December 23. This pump immediately lowered the water and held it at a stage from 9 to 11 feet below low water to the end of the month.

Drilling and blasting for rock excavation was commenced late in November and continued to the end of the year. The plant employed consisted of seven jack-hammer drills and three portable gasoline-engine driven compressors.

Blasting began with 50 per cent gelatin dynamite on hand from subaqueous work and, while this explosive lasted, was fairly satisfactory. Forty per cent Trojan powder was then used and did not prove satisfactory in that it did not break the bottom in wet holes.

Excavation by steam shovel was commenced in December on pilot cut adjacent to cofferdam, the waste rock being cast on the berm against the dam or carried ahead by dump cars and used to build a

grade across a deep water hole. A cut about 525 feet long was made and bottom grade of canal obtained, although blasting ahead of the shovel had to be resorted to in a few cases where Trojan powder had been used.

Open canal.—In connection with the construction of the canal drill boat 426 was engaged from May 5 to November 10 in drilling and blasting on outer patch of rock in the upper approach to the canal. The ledge was miscellaneous in character, containing both hard and soft rock, and in many places was full of gravel pockets, which made drilling and loading slow at times. Good progress was made on the total season's work.

After delays in cofferdam progress had occurred it became apparent that very little rock from the pit excavation could be depended on for protection to cofferdam in freezing weather, and therefore the dipper dredge *Keokuk* was transferred to Le Claire and started work on excavation of rock from outer patch which had been blasted by the drill boat 426. The rock was loaded into dump boats and flat barges and was banked against the cofferdam at points where protection was considered advisable.

Cofferdam.—Preparations for cofferdam construction were carried on during March and April in framing timbers and building of small pontoons, from which the operations were conducted. Actual erection commenced on May 1 on shore at station 12-50 of the Le Claire Canal survey base line, the coffer being extended downstream and riverward at an angle of about 30° with the shore until the line of the permanent dam was reached, when the direction was changed to conform with the location of the permanent dam, of which the coffer will constitute a core. This line was followed to a point opposite station 88, where the coffer was returned to shore. Total length of cofferdam was 8,680 feet. Actual closing junction with shore was made on October 21. The cofferdam is of the ordinary box type.

Much trouble was encountered by heavy currents of water running obliquely through the cofferdam, and, while it was anticipated that the use of holding lines to anchors and spud boats would be necessary to support the structure previous to filling, heavy steel cables held by anchor bolts in the river bottom had to be resorted to at times.

The filling for the cofferdam consisted of river silt containing sand and gravel dug by dipper dredge from bars on the Illinois shore opposite the upper end of the work. It was transported on flat barges to the dam and unloaded by derrick boats. When the work was commenced the quality of the filling material was good, but later in the season the percentage of river silt was too great, making the filling too light. When the work was nearing completion some gravel was secured at the lower end of a rock patch at the head of the rapids and placed in the dam. The filling of the dam was completed in November.

The dam was erected to the height of an 8-foot water stage in the river, and owing to irregularity of the depth to rock bottom the actual heights ranged from 8 to 24 feet; mean height, 13.9 feet.

Lumber (1,123.723 M b. m.).—Placed in the cofferdam, including all charges, the lumber cost \$43.97 per M feet.

Steel (\$19,844 pounds).—The steel placed in the dam cost \$0.0362 per pound.

Dredging.—The filling was dug by dipper dredge *St. Paul* from bars on the Illinois shore above Rapid City, Ill., opposite the head of the construction work. The spoil was loaded onto flat barges, towed to the cofferdam, and unloaded by derrick boats. Total material dredged, measured by displacement in barges, was 100,013 cubic yards.

Towing.—Towing cofferdam material was done by towboats *Grace* and *Ruth*, assisted during the latter part of the season by the new towboat *Le Claire*. The material, amounting to 1,083 cubic yards, was handled by dump boats and placed as banking against the cofferdam. The cost of the filling in place, including dredging, towing, and unloading, was \$0.411 per cubic yard, of which for dredging, \$0.0603; for unloading, \$0.1158; for towing, \$0.0842; and plant charge, \$0.1461.

Blasting rock in open canal.—Subaqueous drilling and blasting was carried on in a patch of rock lying in the upper approach to the canal immediately above the cofferdam. Drill boat *426* was shipped up and began operations on May 5, continuing throughout the season until November 10, being laid up and towed to winter quarters at Moline on November 17. Good progress was made on the season's work as a whole, although both drilling and loading was retarded by hardpan at the lower end of the patch and by gravel pockets and porous rock over the whole area. Single lines of holes were fired in the hardpan strata, but as the work progressed upstream and the harder rock was encountered, double lines and finally triple lines were fired in one blast. Penetration in feet per drill per hour for the entire season was 7.5. This rate is computed on total time, no lost time for loading, moving blasts, running anchor lines, and other delays being considered. The yardage to 6-foot grade was 20,468, and the cost of drilling and blasting \$41,118.20, or \$1.2936 per cubic yard. If we allow 1 foot below grade, the quantity would be about 32,700 cubic yards, or \$0.7651 per yard.

Dredging rock in open canal.—On September 7 dipper dredge *Keokuk* began excavation of rock on the lower end of outer patch in upper approach to the canal. Operations were continued to November 17, when the dredge was towed to Keokuk for repairs. The dredge *St. Paul* was engaged in excavating rock on this patch from November 10 to 17. It was not intended that excavation of this patch would be carried on at this time, but delays to cofferdam construction in June and July made it probable that very little rock from steam shovel would be available for banking outside of dam. Excavation was commenced therefore and the waste rock piled against the cofferdam for protection from running ice. It was transported on flat barges and dump boats. The former were unloaded by derricks.

	Cubic yards.
Excavation, dredge <i>Keokuk</i>	12, 799
Excavation, dredge <i>St. Paul</i>	1, 960
Total.....	14, 759

Measurement by displacement figured in solid yards at a cost including all charges of \$13,795.65, or \$0.9347 per yard.

Summary of expenditures and costs, Le Claire Canal, to Dec. 31, 1915.

EXPENDITURES.

Account.	Voucher payments.	District office charge.	Floating plant charge.	Store-boat charge.	Liabilities, Dec. 31, 1915.	Totals.
Costs prior to 1915.....	\$17,983.19	\$493.31	\$178.19	\$47.32	.....	\$18,697.01
Costs for 1915.....	175,396.28	3,568.18	33,992.90	1,607.61	\$22,514.57	237,082.54
Transfer from open-channel work (coal).....	100.80	.....	.....	.....	.....	100.80
Total accountability.....	193,483.27	4,061.49	34,166.09	1,654.93	22,514.57	255,890.35

COSTS IN DETAIL.

Account.	Quantities.	Net field cost.		Including district office and floating plant.	
		Amounts.	Unit cost.	Amounts.	Unit cost.
Cofferdam construction:					
Lumber, M b. m.	1,123.723	\$46,732.38	\$41.5871	\$49,408.38	\$43.9684
Steel, pounds.....	319,244	10,745.39	.0837	11,555.09	.0362
Filling, cubic yards.....	100,013	26,032.20	.2594	41,116.90	.4111
Total cost cofferdam, linear feet.....	8,680	83,509.97	9.6210	102,080.37	11.7604
Rock excavation—subaqueous:					
Drilling and blasting, drill boat 426, cubic yards.....	20,468	18,578.45	.9077	26,478.64	1.2936
Dredging, Keokuk and St. Paul, cubic yards.....	14,759	5,660.73	.3835	13,795.65	.9347
Rock excavation—dry:					
Pumping.....	.....	6,673.25	.....	7,200.25	.....
Ditching.....	.....	641.59	.....	641.59	.....
Cofferdam maintenance.....	.....	849.39	.....	849.39	.....
Steam-shovel excavation, cubic yards, net.....	1,507.8	41,877.01	27.442	43,505.45	28.8536
Total cost, steam-shovel excavation, cubic yards.....	1,507.8	49,541.24	32.8522	52,196.68	34.6178
Drilling and blasting, cubic yards.....	3,370.8	11,015.97	3.2686	11,489.29	3.4084
Items not charged out:					
Stock.....	.....	35,120.67	.....	35,120.67	.....
Plant.....	.....	48,885.14	.....	14,719.06	.....
Superintendence and office.....	.....	3,568.18	.....	.....	.....
Total accountability.....	.....	255,890.35	.....	255,890.35	.....

During 1916 to July 1 the pit of the cofferdam was flooded by high water and large quantities of sand came in over the cofferdam walls. Considerable work was performed for maintenance of dam.

Suction dredge *Geyser* was employed during the latter part of May and until June 24 in removing sand from the pit, amounting to 39,179 cubic yards, the operating cost of which was \$3,715.42. During the remainder of June the *Geyser* was engaged in pumping water to unwater the pit. In May 2,190 solid cubic yards was excavated from the upper patch outside of the cofferdam and used to strengthen the dam.

Rock Island to Burlington (79 miles).—In this division, which was in charge of Assistant Engineer J. C. McElherne, work in construction of dams and shore protections was carried on both under formal contract and by hired labor with use of Government plant.

Under formal contract with Builders Sand & Gravel Co., approved February 6, 1915, at \$1.57 for rock and \$0.68 for brush per cubic

yard in place, operations began March 29, 1915, and with several suspensions on account of high water, the contract was completed August 21. This work, between Montpelier and Fairport (miles 377–382), consisted in repair of 8 spur dams, extensions of 5 (1,665 linear feet), and construction of 4—the extensions and 3 of the new dams are not fully completed—(2,770 linear feet). One trailer, 2,670 feet long, was built. There were put in place 8,986.3 cubic yards rock and 35,171.9 cubic yards brush at a cost of \$40,884.73, or \$0.9258 per cubic yard.

Under contract with the same company approved April 22, 1915, for similar work at the same prices, operations began September 1 and were discontinued for the winter November 19. The work which was carried on between Montpelier and Fairport comprised the repair of 3, the extension of 3, the completion of 2, and the construction of 4 (3,900 linear feet) spur dams. There were put in place 10,745.1 cubic yards rock and 16,283.4 cubic yards brush at a cost of \$29,647.79, or \$1.093 per yard.

By hired labor operations were carried on from June 30 to November 13, 1915, between Andalusia and Fairport (miles 372–383) and below Oquawka (mile 433). Towing was done by the *Mac*, *Acorn*, and *Minnie Schneider*, the last two named leased. Materials were purchased in open market at 87 and 92 cents per cubic yard for rock, 26 and 28 cents for brush; lumber \$14 and \$16.25 per thousand feet board measure. Miscellaneous work was performed, including the construction of 570 feet of shore protection on Island 369, in which a lumber apron mat was used, the maintenance of 5 closing dams, repair of 1 spur dam, extension of 2 spur dams (715 linear feet), the construction of 1 closing and 2 spur dams (1,950 linear feet), and the commencement of 4 spur and 1 closing dams (4,250 linear feet). Hydraulic dredge *Mayon* assisted in the construction of many of these dams with a sand fill as described in Asst. Engineer R. Monroe's special report, which gives quantities and estimated saving by this method. There were put in place 17,862.6 cubic yards rock and 27,519.4 cubic yards brush at a cost, including all charges, of \$51,783.37, or \$1.1415 per cubic yard.

Dredge *Mayon*, with triple crew, was employed in vicinities of Fairport and Montpelier and in Muscatine Slough in channel dredging, as reported by Mr. Monroe. Many detailed surveys and examinations were made in this division, aggregating in length 30 miles.

The hired labor plant was laid up for the winter at Milan.

At the United States boat yard at Milan were repaired during 1915, 1 drill boat, 2 dredges, 2 towboats, 4 launches, 7 motor skiffs, 8 quarter boats, 5 office boats, 1 building boat, 1 store boat, 2 fuel flats, and 31 barges. There were built 1 pile driver, 4 dump scows, 1 motor boat, and 15 skiffs.

No field or construction work was done in this division in 1916 to July 1, other than dredging in Muscatine Slough, reported under head of "Operating snag boats," etc.

Burlington to Hannibal (98 miles).—This division was in charge of United States Civil Engineer M. Meigs. No work was done between Burlington and Keokuk, as the backwater of the power dam at Keokuk affords for this stretch of 42 miles sufficient depth for the 6-foot channel project, eliminating the estimated cost of its improvement, amounting to over \$900,000.

Hired-labor work with Government plant, which was carried on at various localities between Fox River and La Grange (miles 493-515) and at Whitney's Bar (mile 532) was begun April 29 and discontinued November 15, 1915, when the plant was laid up for the winter at Keokuk. Towing was done by the *Ellen* and *Emily*. Material purchased in open market, rock, 64 cents; brush, 25 cents per cubic yard on barges; and lumber, \$13 per M feet. The work consisted in the repair of 2 pieces of shore protection and 4 dams, extensions of 2 spur dams (850 linear feet), construction of 4 spur dams (6,525 linear feet), and of 2 pieces of shore protection (2,386 linear feet). A portion of the apron mat on Island 532 was built of lumber, of which 32,914 feet b. m. was used and converted into brush equivalent of 1,920 cubic yards. Hydraulic dredge *Apo* was used to pump a sand base in several of the dams, as elsewhere described. There were put in place by hired labor 20,461.5 cubic yards rock and 43,563 cubic yards brush (including the commuted lumber), at a cost, including all charges, of \$66,638.72, or \$1.0409 per cubic yard.

Under formal contract with the A. V. Fetter Co., approved October 12, 1915, for construction work between Quincy and Hannibal, operations were begun September 8, 1915, and the contract was completed December 1. The contract prices were \$1.63 per cubic yard for rock and \$0.62 for brush in place. Repairs were made to 4 spur dams and sand catchers and 4 were extended (1,070 linear feet). One trailer was built (1,190 linear feet) and 2 spur dams (3,280 linear feet), as also 1,500 linear feet of shore protection on Beebe Island (mile 533). There were put in place 12,896.7 cubic yards rock and 32,670.5 cubic yards brush, at a cost of \$43,989.58, or \$0.9654 per cubic yard.

No field or construction work was done in this division in 1916 to July 1 other than dredging in Fort Madison Harbor, reported under head of "Harbors and landing places."

Hannibal to mouth of Missouri River (116 miles).—In this division, in charge of Asst. Engineer A. L. Richards, work in construction of dams and shore protections was performed by hired labor and use of Government plant, and also by contract.

Under formal contract with J. W. McMurry Contracting Co., approved February 6, 1915, for work between Hamburg and Grafton, at \$1.59 per cubic yard for rock, \$0.58 for brush, and \$23 per thousand feet, board measure, for lumber in place, operations commenced March 29, 1915, and were carried on until December 3, when the contract was completed. Work, which was much interfered with by high stages of the river and also delayed by the inefficient plant of the contractor, was done in vicinities of Stag Island (mile 603), Dardenne Island (mile 625), and Masons Island (miles 633-635). Four dams were built (2,565 linear feet), 5 were raised and repaired, and 1 piece of shore protection on willow bar at Dardenne Island was constructed. A great part of the work could not be trimmed and completed on account of high water. There were put in place 14,829.4 cubic yards rock and 24,276.9 cubic yards brush, at a cost of \$40,825.65, or \$1.044 per cubic yard.

By hired labor, with use of Government plant, the *Coal Bluff*, *Lucia*, *Emily*, and *Goldenrod* doing the towing, work was carried on April 1 to December 1, 1915, when plant was laid up for the winter,

a part in Alton Slough, a part in Quincy Bay, and the remainder at Keokuk. Material was purchased in open market at the following prices on barges: Rock, 79 $\frac{1}{2}$ and 80 cents; brush, 24, 24 $\frac{1}{2}$, 24.9, 25, 27, and 28 cents per cubic yard; lumber \$13 per thousand feet board measure. One outfit worked in vicinity of Ilasco (mile 545) and Saverton (mile 547), another in vicinity of Hop Hollow (mile 649), while a shore-protection gang operated at Portage, Slim, and Masons Islands. Three dams were extended (975 feet), 11 were raised and repaired, and 5 were built (4,750 linear feet); 2 pieces of shore protection were built (4,500 linear feet); and rock was carried to top of bank on 2 pieces. In the shore protection 63,199 feet, board measure, lumber was used, which was commuted to brush at 60 cubic yards per thousand feet (3,791.9 cubic yards). There were put in place in the hired-labor work 45,866.8 cubic yards rock and 82,721.5 cubic yards brush, at a cost, including all charges, of \$128,550.52, or \$0.9997 per cubic yard.

Dipper dredge *Keokuk* was assigned to work in this division to remove obstructive dams, but owing to high stages of water prevailing was able to do very little. The cost of this detail was \$2,045.90.

During the season a number of short detailed surveys were made, covering about 31 miles of river.

No work was done in the field in this division in 1916 to July 1.

Hydraulic dredging, St. Paul to mouth of Missouri River.—The pipe-line dredges are in charge of Asst. Engineer R. Monroe, from whose report extracts are made as follows:

During the calendar year 1915 only six of the eight pipe-line dredges belonging to this district were in commission. The two not in service, the *Hecla* (15-inch) and *Vesuvius* (15-inch), remained in their winter quarters during the year.

General repairs, renewals, etc., were made to dredges *Geyser*, *Pelee*, *Vesuvius*, *Etna*, *Mayon*, *Taal*, and *Apo* during the winter of 1914-15. No repairs were made to dredge *Hecla*. During the winter of 1914-15 the following alterations were made: The 18-inch discharge pipe on dredge *Mayon* was replaced with 20-inch pipe and the accordion joint in the suction pipe on dredge *Etna* was replaced with a ball joint.

During the season extensive repairs were made to the *Pelee's* main pump, suction and discharge pipe, and general repairs were made to boilers, main engine, and feed pumps. The repair cost on this dredge was high, for the reason that the material handled was mostly gravel and loose rock.

Boiler and grate tests made on the *Geyser* in May indicated an efficiency for the boilers of 54.1 per cent, operated at a capacity of four times the builder's rating. Compared with previous tests under normal load, practically the same efficiencies were obtained.

Dredging operations were carried on at three localities in the Milan section of the Illinois & Mississippi Canal, at two localities in Moline Pool, at 10 localities in channel of Mississippi River, and in Dubuque ice harbor, to improve the steamboat channel. In addition to this work considerable dredging was done to obtain material and deposit it as foundations for spur dams, which are usually constructed wholly of rock and brush.

In pumping material for dams, the material was taken from the channel where possible and pumped through various lengths of discharge pipe and discharged upstream above range of dam, so that in settling it would be on range of dam. The distance at which material is discharged above range of dam depends largely on the current and kind of material. The distance ranged probably from 25 to 200 feet.

The *Etna*, with double crew, was engaged 96 days; the *Mayon*, with triple crew, 36 days; the *Taal*, with single crew, 35 days; and the *Apo*, with double crew, 79 days. All told, these dredges filled the bases of 27 dams, effecting a total saving of about \$61,763 in favor of this method of building dams, provided the filling is permanent, which will be later determined.

The area covered by dredging was 7,751,820 square feet, being a total length of about 13.34 miles of steamboat channel improvement, averaging a width of 110 feet and a depth of digging of 6.02 feet, and involved the removal of 1,731,115 cubic yards of sand, mud, gravel, and loose rock.

The *Geyser*, a 12-inch dredge, was in operation with double crew April 3 to August 31, and with a single crew from September 1 to October 20, in Milan section of Illinois and Mississippi Canal, in Mississippi River between Rock Island and Burlington, and in Moline Pool, and removed 234,448 cubic yards of sand, gravel, and mud.

The *Pelee*, a 15-inch dredge, was in operation with triple crew from May 11 to November 8, inclusive, in the Mississippi River in the vicinity of Grey Cloud Island (miles 19-20), and between Lock No. 1 and Omaha Bridge (miles 3-4), and removed 180,241 cubic yards of material, consisting of approximately 60 per cent gravel, 30 per cent loose rock, and 10 per cent sand.

The *Etna*, an 18-inch dredge, was in operation with double crew July 21 to November 9, inclusive, in the Mississippi River (miles 214, 215, 251, 260, and 262), and in Dubuque Ice Harbor (mile 265), and removed 297,154 cubic yards of sand. She made a good showing in dam construction, making a probable saving of about \$24,000, a figure subject to modification according to future examinations as to permanency.

The *Mayon*, an 18-inch dredge, was in operation with triple crew from May 21 to November 4, inclusive, in the Mississippi River (miles 379, 381, 383, 391, 431, and 432), and removed 739,101 cubic yards of sand. A part of the spoil was deposited in the base of dams, showing a saving of about \$9,600, if found permanent.

The *Taal*, an 18-inch dredge, was in operation with single crew September 2 to October 28, in the Mississippi River (mile 92) and removed 70,125 cubic yards of sand.

The *Apo*, an 18-inch dredge, was in operation with double crew August 26 to November 23, inclusive, in Mississippi River (miles 495, 516, 532, and 548), and removed 210,046 cubic yards of sand. The indicated saving in dams by sand fill was about \$18,000, a figure subject to future modification.

Dredging comparisons, calendar year 1915.

Name of dredge.	Size of pump.	Indicated horse-power.	Hours pumping.	Cubic yards dredged per hour.	Cubic yards dredged per I. H. P. per hour.	Total cubic yards dredged.	Average operating cost per cubic yard.	Average cost per cubic yard, including all charges.
	<i>Inches.</i>							
Geyser.....	12	150	1,476	158.84	1.0589	234,448	\$0.0759	\$0.1037
Hecla ¹	15							
Pele ²	15	225.5	2,124	84.85	.3762	180,241	.1178	.158
Vesuvius ¹	15							
Etna.....	18	269.9	951	312.4	1.1574	297,154	.0336	.0473
Mayon.....	18	246.25	2,177	339.5	1.3786	739,101	.0320	.0422
Taal.....	18	246.8	209	335.5	1.3594	70,125	.0732	.103
Apo.....	18	323.3	654	321.1	.9931	210,046	.0444	.060
Total.....			7,591			1,731,115	.0628	

¹ Not in operation during season.

² Very hard digging.

Based on the supposition of stability, which up to date seems warranted, although the sand dams have been exposed for many months to high stages of the river, the total saving in cost of dams in which the dredges supplied a sand base, is \$61,762, as was reported in 1915.

In 1916 to July 1 suction dredge *Geyser* was employed as elsewhere reported on the LeClaire Canal for about six weeks in May and June, and dredge *Mayon* for eight days in July at Moline pool.

Plant.—There has been expended to December 31, 1915, since the commencement of improvement in 1878:

Floating plant.....	\$2,885,884.92
Quarry plant.....	52,743.53
Boat-yard plant.....	¹ 107,603.37

Total for plant..... 3,046,231.82

The estimated value January 1, 1916:

Floating plant.....	\$755,666.36
Quarry plant.....	8,836.73
Boat-yard plant.....	² 63,260.44

Total..... 827,763.53

Summary showing localities, quantities, and cost of regular construction works in calendar year 1915 between Minneapolis and mouth of Missouri River (winter work not included in this statement).

Method and locality.	Material.			Operat- ing cost.	Operat- ing cost per cubic yard.	General superin- tendence and plant charge.	Total cost.	Total cost per cubic yard.
	Rock.	Brush.	Total.					
HIRED LABOR.								
	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>					
St. Paul to Lake Pepin.....	1,998.3	6,204.2	8,202.5	\$7,232.51	\$0.882	\$1,644.84	\$8,877.35	\$1.062
Lake Pepin to Winona.....	32,218.5	60,548.4	92,766.9	77,272.58	.833	22,662.79	99,935.37	1.077
Winona to Wisconsin River.	23,563.3	47,818.2	71,381.5	59,012.98	.827	17,333.23	76,346.20	1.070
Wisconsin River to Le Claire.	30,305.0	61,109.2	91,414.2	66,900.11	.732	18,221.75	85,121.86	.981
Rock Island to Burlington...	17,862.6	27,519.4	45,382.0	40,406.90	.890	11,376.47	51,783.37	1.141
Burlington to Hannibal.....	20,461.5	43,563.0	64,024.5	50,604.85	.790	16,033.87	66,638.72	1.041
Hannibal to Missouri River..	45,866.8	82,721.5	128,588.3	103,832.05	.807	24,709.47	128,541.52	1.000
CONTRACT.								
Cassville to Finleys, 1914....	12,333.3	26,666.7	40,000.0	38,843.40	.971	1,090.66	39,939.06	.998
Buena Vista to Spechts Ferry, 1915.....	14,875.4	29,751.0	44,626.4	42,291.92	.948	1,003.12	43,295.05	.970
Do.....	2,916.6	2,978.1	5,894.7	6,569.23	1.114	161.36	6,730.59	1.142
Montpelier to Fairport:								
1914.....	8,986.3	35,171.9	44,158.2	39,804.83	.901	1,079.90	40,884.73	.926
1915.....	10,745.1	16,883.4	27,628.5	25,791.46	1.061	850.33	26,647.79	1.093
Canton to Quincy, 1914.....	13,355.1	29,619.2	42,974.3	40,290.54	.937	1,004.12	41,294.66	.961
Quincy to Hannibal, 1915...	12,896.7	32,670.5	45,567.2	42,861.02	.941	1,108.56	43,969.58	.965
Hamburg to Grafton, 1914....	14,829.4	24,276.9	39,106.3	39,545.96	1.011	1,279.69	40,825.65	1.044
Total.....	264,212.9	527,001.6	791,215.5	684,285.34	.865	119,566.16	803,851.50	1.016

¹Including land.

²Not including land.

Tabulation showing the probable comparative savings made on the construction of rock and brush dams during the calendar 1915 by filling in the foundations with sand.

Designation.	Estimate No. 2.			Actual quantities.		Saving.		Value o' saving.	Cost of sand filling.	Actual saving.	Remarks.
	Rock.	Brush.		Rock.	Brush.	Rock.	Brush.				
Etna (Wisconsin River to Le Claire):											
Dam 231/214.....	3,225.0	8,575.0	1,630.6	4,703.5	1,594.4	3,871.5		\$5,090.30	\$1,878.48	\$3,210.82	Average cost per cubic yard rock and brush in place \$0.9311.
Dam 331/214.....	3,090.0	8,100.0	1,481.3	4,420.5	1,098.7	3,670.5		4,923.84	894.88	4,088.96	
Dam 431/214.....	2,225.0	5,725.0	1,548.4	4,420.5	1,076.6	4,205.3		5,560.93	626.16	4,934.77	
Dam 531/215.....	2,180.0	5,740.0	683.0	1,479.0	4,318.0	4,318.0		5,897.59	936.16	4,961.43	
Dam 20/55/251.....	2,160.0	4,410.0	2,065.6	5,177.2	-42.5	-767.2		785.57	936.24	1,721.81	
Dam 30/55/251.....	1,130.0	3,000.0	1,589.9	1,775.7	570.1	1,224.3		1,670.77	626.16	1,044.61	Contract dams. Average cost per cubic yard in place, \$0.9702.
Dam 22/36/260.....	2,730.0	7,245.0	1,669.9	3,240.5	1,070.1	4,004.5		4,724.96	1,147.76	3,577.20	
Dam 24/36/262.....	2,810.0	7,470.0	1,946.6	2,012.0	1,843.4	5,458.0		5,798.33	1,356.68	4,441.65	
Dam 26/36/262.....	2,800.0	7,000.0	1,099.3	2,506.5	1,510.7	4,493.5		5,560.51	1,431.04	4,129.47	
Dam 27/36/262.....	1,720.0	4,580.0	815.7	1,399.1	904.3	3,180.9		3,803.73	521.80	3,281.93	
Total actual saving.....										34,336.17	
Mayon (Rock Island to Burlington):											
Dam 7/57/432.....	1,714.0	2,542.0	1,033.4	1,406.1	680.6	1,135.9		2,073.53	1,391.92	681.61	Average cost per cubic yard rock and brush in place, \$1.1415.
Dam 6/57/432.....	3,625.0	3,550.0	2,764.7	2,893.0	860.3	667.0		1,743.41	831.55	861.86	
Dam 8/57/432.....	2,407.0	4,814.0	1,788.0	3,478.5	619.0	1,335.5		2,231.06	566.77	1,674.29	
Dam 9/57/432.....	1,818.0	4,645.0	961.0	2,348.0	857.0	2,267.0		3,600.23	927.95	2,672.28	
Dam 10/57/432.....	2,130.0	5,476.0	663.0	1,080.0	1,467.0	4,386.0		6,681.20	1,113.54	5,567.66	
Total actual saving.....										11,457.76	
Ape (Burlington to Hannibal):											
Dam 14/64/465.....	4,683.0	12,483.0	5,941.81	10,150.4	781.19	2,332.59		3,264.80	2,101.80	1,163.00	Average cost per cubic yard rock and brush in place, \$1.0687.
Dam 30/70/532.....	5,910.0	15,500.0	2,680.5	7,904.3	3,225.5	7,655.7		10,506.38	5,043.33	5,463.05	
Dam 32/70/532.....	5,883.0	15,640.0	2,210.0	5,877.0	3,673.0	9,772.0		14,234.22	3,083.19	11,151.03	
Total actual saving.....										17,779.09	
Total apparent saving on all work.....										63,573.02	

¹ Not completed.

Note.—Supposing the original estimate reliable and the sand fill permanent, the cost per yard in place is reduced in division Wisconsin River to Le Claire from 95 cents to 50 cents; Rock Island to Burlington from \$1.14 to 74 cents; Burlington to Hannibal from \$1.16 to 76 cents.

WINTER WORK.

In January and February, 1916, a number of spur dams were built and repaired at several localities, on or through the ice, under special agreements. Much less work than was intended was accomplished, the winter being too mild and the ice in consequence too insecure for teams hauling material. The methods of construction are about the same as are used in summer work, but no floating plant is required, so that the great expense of towboats, barges, quarter boats, etc., used in open-river work is eliminated.

Winter work, 1916.

Location and designation.	Work begun and ended.	Material.			Cost, including inspection.	
		Rock.	Brush.	Total.	Total.	Average per cubic yard.
Between La Crosse and Brownsville 5 dams were repaired.	January and February, 1916. Contract prices for material in place: Rock, \$1.40 to \$1.60; brush 33 to 42 cents per cubic yard.	<i>Cu. yds.</i> 3,402.8	<i>Cu. yds.</i> 5,173.8	<i>Cu. yds.</i> 8,576.6	\$7,600.04	\$0.897
In vicinity of Wyandling 3 spur dams built.	January and February, 1916. Contract prices for material in place: Rock, \$1.179 to \$1.189; brush 38 and 39 cents per cubic yard.	2,611.7	6,574.0	9,185.7	6,270.79	.683
Total.....	.....	6,014.5	11,747.8	17,762.3	13,860.83	.786

SPECIAL WORK.

DREDGING IN HARBORS AND AT LANDING PLACES—MAINTENANCE OF UNITED STATES LEVEES.

Flint Creek to Iowa River levee.—During the flood of May, 1916, this Government levee was threatened by wave wash in various places, and some assistance was given the owners of reclaimed land by a prompt distribution of sacks. The cost of this work was \$653.70.

Harbor at Fort Madison, Iowa.—This harbor, intended as a refuge for launches and other craft, lies just below the Santa Fe bridge, and is mostly used by fish boats and launches, though it can be used by a steamboat on occasion. The south entrance is 90 feet wide and the north entrance 80 feet, with an extreme width of harbor of 200 feet. The sea wall that protects the harbor is built of brush mattresses covered with stone, and is 800 feet long. Its top is from 2 to 4 feet above low water, stage 13 feet on Fort Madison gauge. The principal obstruction in the harbor consisted in a dense growth of willows, which interfered with the movement of boats. Work began by dredge *Keokuk* and steamer *Coal Bluff* May 15. On the 17th the *Coal Bluff* was sent back to Keokuk and the tender *Lucia* took her place towing dumps. One cut was made the whole length of the sea wall, 25 feet from the same to a grade of 6 feet below low water=7 feet on Fort Madison gauge. This cut was all cast on top and outside of the sea wall. The rest of the dredging consisted in going over the

willow patches and removing them and snags. The grade attained was about 5 feet below low water.

Total cubic yards cast.....	4,068
Total cubic yards loaded and dumped.....	1,910
Total cubic yards removed.....	5,978

The sea wall was built by the city in cooperation with the Santa Fe Railroad. There was expended on this work \$498.50.

The total amount expended at all the selected harbors under this head of appropriation to June 30, 1916, is \$155,740.68, including United States levees.

ALLOTMENTS FOR DREDGING AND LEVEES.

May 2, 1907.....	\$50,000.00
May 27, 1908.....	50,000.00
June 25, 1910, including levees.....	75,000.00
Feb. 27, 1911, including levees.....	75,000.00
July 25, 1912, levees only.....	25,000.00
Total.....	275,000.00
Transferred to general improvement.....	112,577.40
	162,422.60

There is an unexpended balance July 1, 1916, for harbors, landing places, and United States levees of \$6,680.92.

Estimate for a 6-foot channel at low water, Mississippi River, St. Paul to Missouri River, under current project, showing amounts expended to Dec. 31, 1915, under each item.

Division.	Estimate.	Expended to Dec. 31, 1915.
Lock No. 1 to Omaha Bridge: ¹		
Dams and shore protections.....	\$70,600	\$56,391.15
Repairs to existing work.....	9,000	
Dredging.....	185,500	51,427.15
Estimate of tentative project.....	265,100	107,818.30
St. Paul to foot of Lake Pepin:		
Dams and shore protections.....	\$702,675	8,068.97
Repairs.....	163,850	45,463.66
Dredging.....	192,000	100,459.02
	1,058,525	153,991.67
Lake Pepin to Winona:		
Dams and shore protections.....	\$70,750	606,149.86
Repairs.....	144,285	142,339.79
Dredging.....	288,000	127,608.06
	1,303,035	876,147.71
Winona to Wisconsin River:		
Dams and shore protections.....	2,316,225	649,274.31
Repairs.....	76,500	268,150.45
Dredging.....	240,000	57,425.57
	2,632,725	984,850.33

¹The section Lock No. 1 to Omaha Bridge was added to the district after the estimate was made. A tentative estimate is given, but it was not included in the original project. The expenditures on this section are, however, included, as it is thought the saving made by the backwater of the power dam at Keokuk on the original estimates from Burlington to Keokuk will more than cover the cost of the improvement of this additional section.

Estimate for a 6-foot channel at low water, Mississippi River, etc.—Continued.

Division.	Estimate.	Expended to Dec. 31, 1915.
Wisconsin River to Savanna:		
Dams and shore protections.....	\$2,108,250	\$1,066,232.18
Repairs.....	40,500	83,512.45
Dredging.....	168,000	97,782.39
	2,316,750	1,247,526.02
Savanna to Rock Island Rapids:		
Dams and shore protections.....	1,480,849	55,203.19
Repairs.....	20,250	1,949.02
Dredging.....	96,000	22,480.84
	1,576,599	79,632.05
Rock Island Rapids:		
Canal and rock excavation.....	3,099,080	824,482.91
Rock Island to Burlington:		
Dams and shore protections.....	1,932,918	517,253.42
Repairs.....	72,000	52,167.44
Dredging.....	96,000	122,480.54
Rock excavation.....	100,000	69,184.33
	2,200,918	761,085.73
Burlington to Montrose:		
Dams and shore protections.....	512,163	7,776.69
Repairs.....	63,000	6,841.62
Dredging.....	48,000	907.94
	623,163	15,526.25
Des Moines Rapids:		
Dam above guard lock.....	9,000	
Rock excavation.....	346,800	
	355,800	
Keokuk to Hannibal:		
Dams and shore protections.....	1,012,764	563,742.02
Repairs.....	87,750	77,576.78
Dredging.....	48,000	52,136.92
Rock excavation.....	98,000	67,378.69
	1,246,514	760,728.41
Hannibal to Missouri River:		
Dams and shore protections.....	2,122,945	938,847.21
Repairs.....	270,446	159,599.97
Dredging.....	324,000	77,856.93
	2,717,391	1,176,274.11
Maintenance during construction.....	870,000	41,409.02
Total of project.....	20,000,000	
Expended for floating plant, quarry, and boat yards, not yet distributed.....		856,199.37
Total amount expended on project.....		7,865,675.88

¹ Lake Pepin to Winona, \$2,561.94; Winona to Wisconsin River, \$13,921.55; Wisconsin River to Savanna, \$4,469.96; Rock Island to Burlington, \$20,465.86; total maintenance, \$41,409.02.

NOTE.—The total amount expended to Dec. 31, 1915, since the 6-foot project was adopted is \$8,054,946.63, from which is to be deducted as not pertaining to the project: Dredging in harbors and at landing places and levees, \$154,589.48; Isthmian Canal and Lighthouse Establishment, \$10,288.85 (to be refunded); special surveys, etc., \$24,392.42; total, \$189,270.75, leaving a balance of \$7,865,675.88 chargeable to the improvement.

It appears (as shown in H. Doc. No. 1491, 63d Cong., 3d sess., pp. 488-493) that the total appropriations made by Congress for all projects for the improvement of the Mississippi River between Missouri River and Minneapolis are, under the different heads, as follows:

St. Paul to Des Moines Rapids-----	\$3, 149, 250.00
Minneapolis to Des Moines Rapids-----	1, 100, 000.00
Missouri River to Minneapolis-----	11, 500, 000.01
St. Paul to Missouri River-----	5, 020, 000.01
Des Moines Rapids to Illinois River-----	6, 380, 950.00
Des Moines Rapids to Ohio River-----	100, 000.00
Illinois River to Missouri River-----	205, 000.00
Grand total-----	27, 455, 200.02

APPROPRIATIONS.

Total appropriations under all former projects from June 15, 1844, to Mar. 4, 1912, as compiled from House Document No. 1491, Sixty-third Congress, second session-----	19, 155, 200.02
For current 6-foot channel project, Missouri River to Minneapolis:	
Mar. 2, 1907 (river and harbor)-----	\$500, 000.00
May 27, 1908 (river and harbor)-----	500, 000.00
Mar. 4, 1909 (river and harbor)-----	500, 000.00
June 25, 1910 (river and harbor)-----	500, 000.00
June 25, 1910 (sundry civil)-----	500, 000.00
Feb. 27, 1911 (river and harbor)-----	1, 250, 000.00
July 25, 1912 (river and harbor)-----	1, 250, 000.00
Mar. 4, 1913 (river and harbor)-----	1, 500, 000.00
Oct. 2, 1914 (river and harbor)-----	800, 000.00
Mar. 4, 1915 (allotments)-----	1, 075, 000.00
July 27, 1916-----	1, 500, 000.00
	9, 875, 000.00
Total of appropriations-----	29, 030, 200.02
Less amount transferred to Lock and Dam No. 2, Mississippi River, between Minneapolis and St. Paul-----	49, 877.07
Returned to surplus fund of Treasury-----	237.33
	50, 114.40
Net total-----	28, 980, 085.62
June 30, 1916, receipts from sales, etc-----	32, 005.76
Grand total-----	29, 012, 091.38

CONTRACTS IN FORCE.

Builders Sand & Gravel Co., Davenport, Iowa: Construction and repair of dams and shore protections between Montpelier and Fairport, Iowa, 11,692.3 cubic yards of rock in place, at \$1.55; 29,230.8 cubic yards of brush in place, at 68 cents; plank mattress, at \$45 per 1,000 feet board measure in place, can be used in lieu of brush at the option of the contracting officer; amount of contract, \$38,000.

Contract is dated August 26, 1915; approved October 12, 1915; work was begun September 1, 1915; contract expires October 22, 1916; this contract was 73.146 per cent completed June 30, 1916.

J. W. McMurry Contracting Co., Kansas City, Mo.: Construction and repair of dams and shore protections between Cap au Gris, Mo., and Grafton, Ill.; 13,571.4 cubic yards of rock in place, at \$1.60; 27,142.9 cubic yards of brush in place, at 60 cents; plank mattress, at \$36 per 1,000 feet b. m. in place, can be used in lieu of brush, at the option of the contracting officer. Amount of contract, \$38,000.

Contract is dated August 28, 1915; approved October 12, 1915; this contract was 0.0 per cent completed June 30, 1916 (work not yet commenced); contract expires October 22, 1916.

COMMERCIAL STATISTICS.

Lumber.—The lumber business, formerly of great magnitude on this river as connected with the movement of logs and lumber, has, owing to the destruction of the pine and hemlock forests in Wisconsin contiguous to the Mississippi River and tributaries, dwindled so that in 1915 there was only a small quantity of lumber and lath floated from St. Croix River, chiefly to Fort Madison. The lumber cut at Minneapolis during 1915 was 84,797,760 feet b. m., lath 10,963,750 pieces, but none of this product was floated on the river below the Falls of St. Anthony, although it is believed that on completion of Lock No. 1 a considerable part of the Minneapolis product will find its way down the river.

Steamboats and freight.—There were employed during 1915 between Minneapolis and St. Louis 22 packets, 53 towboats, 25 ferryboats, 134 pleasure boats (not including small motor skiffs), with a gross tonnage of about 18,119 tons. In addition to above there are about 500 unregistered barges used for transporting miscellaneous freight and construction material. The principal steamboat lines on the upper Mississippi River are the Streckfus, the Eagle, the Carnival City, the Wisherd, and the Northern. The number of passengers carried by all boats (including the ferries, 779,683) in 1915 was 2,008,560. The quantity of freight carried by all boats, including the rock, brush, lumber, and other material and supplies loaded on barges and used in Government work, and also including logs and lumber floated down the stream, is shown in the following table, together with approximate ton-miles and valuation:

Upper Mississippi River freight statement for 1915.

Designation.	Short tons.	Ton-miles.	Value.
Rafted lumber and lath.....	7,612	3,434,700	\$108,800
Miscellaneous freight.....	1,247,981	23,535,175	52,226,135
United States material.....	628,075	6,590,415	450,183
Total.....	1,883,668	33,560,290	52,785,118

There is an increase from 1914 of 115,407 short tons in miscellaneous freight. The ton-miles increased 11,489,183 and the value \$11,461,077.

Classified freight traffic, 1915.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Ton-miles.
				<i>Miles.</i>	
Brick.....	5,219,500 pieces.....	15,338	\$601,947	10.0	\$153,560
Brush.....	525,429 cubic yards.....	65,675	153,584	27.4	1,802,242
Cement.....	1,672 tons.....	1,602	7,919	8.2	13,103
Coal.....	27,803 tons.....	27,803	90,283	13.8	384,104
Corn.....	110,461 bushels.....	3,633	70,325	7.0	25,491
Farm produce.....	2,324 tons.....	3,324	119,686	5.96	19,631
Fish.....	7,357 tons.....	7,357	854,520	6.3	46,000
Gravel.....	314,614 cubic yards.....	471,070	162,492	8.1	3,803,416
Hay.....	3,186 tons.....	3,186	43,771	4.96	15,785
Lath.....	5,297,800 pieces.....	1,831	25,410	287.3	528,160
Live stock.....	79,806 head.....	39,968	6,358,657	1.4	56,036
Logs.....	2,128,000 feet b. m.....	9,520	56,458	20.0	196,733
Lumber.....	12,420,606 feet b. m.....	15,624	15,324,590	325.6	6,064,888
Merchandise.....	102,544 tons.....	102,544	15,329,035	74.3	7,619,286
Oats.....	26,376 bushels.....	421	11,421	2.9	1,212
Rock.....	283,325 cubic yards.....	407,061	255,331	12.6	5,216,141
Sand.....	237,127 cubic yards.....	480,361	140,548	4.1	1,775,618
Shells.....	6,771 tons.....	6,771	149,323	15.3	108,553
Shingles.....	1,121,000 pieces.....	6,116	3,393	1.2	144
Teams.....	17,597.....	24,106	5,574,300	1.1	26,139
Wheat.....	97,405 bushels.....	2,673	98,148	8.6	9,232
Wood.....	20,013 cords.....	31,418	100,837	18.1	567,660
Miscellaneous.....	209,062 tons.....	209,062	22,472,640	24.5	5,123,278
Total.....		1,883,668	52,785,118	17.8	33,560,290

WINTER HARBORS.

There are nine harbors on the upper Mississippi where boats can remain in safety during the winter. These harbors are Fountain City Bay (108 miles from St. Paul), mouth of Black River (144 miles), Dubuque ice harbor (265 miles), Moline Pool (359 miles), Davenport ice harbor (368 miles), Milan (Illinois and Mississippi) Canal (367 miles), Keokuk, above and below power dam (482 miles), Quincy Bay (521 miles), and Alton Slough (653 miles).

There is also a harbor at South Stillwater, 28 miles up the St. Croix, in which a portion of the Mississippi River improvement plant winters.

There follow statements showing occupancy during winter 1915-16, for which period temporary harbors for small plants at other localities were occupied.

Fountain City Bay: Government, 4 towboats, 7 quarter boats, 5 office boats, 2 store boats, 4 building boats, 11 fuel flats, 2 grasshoppers, 2 suction dredges, 2 dump scows, 2 catamarans, 30 pontoons, 12 launches and motor skiffs, 56 barges; 139 pieces, about 9,630 gross tons; private, 4 steamboats, 3 quarter boats, 2 barges, 20 motor boats; 29 pieces, about 688 gross tons; total tonnage in Fountain City Bay-----	10, 313
Black River: Government, 1 quarter boat, 1 building boat, 1 grasshopper, 1 fuel flat, 30 barges; 34 pieces, about 3,615 gross tons; private, none; total tonnage in harbor at mouth of Black River-----	3, 615
Winneshiek Slough: Government, none; private, 1 suction dredge, 1 towboat, 1 pile driver, 28 pontoons, 1 catamaran, 20 barges, 2 building boats, 3 grasshoppers, 2 quarter boats; 59 pieces, about 2,874 gross tons; total tonnage in Winneshiek Slough-----	2, 874
Dubuque ice harbor: Government, 2 towboats, 1 suction dredge, 15 pontoons, 1 store boat, 5 quarter boats, 3 office boats, 2 building boats, 2 grasshoppers, 5 gasoline launches, 30 barges, 1 catamaran; 67 pieces, about 7,302 gross tons; private, 2 towboats, 7 gasoline cruisers, 74 gasoline launches, 47 launch houses, 2 house boats, 6 barges, 1 sand pump, 1 ferry dock, 1 swimming pavillion, 2 oil stations; 143 pieces, about 1,386 gross tons; total tonnage in Dubuque ice harbor-----	8, 688
Moline Pool: Government, 1 snag boat, 1 towboat, 2 derrick boats, 2 spud boats, 1 drill boat, 3 quarter boats, 1 store boat, 2 building boats, 2 loading boats, 4 barges, 2 small flats, 1 office boat, 1 launch, 3 motor skiffs; 26 pieces, about 2,145 gross tons; private, 3 steamboats, 1 sand pump on barge <i>Hobson</i> , 10 barges; 14 pieces, about 289 gross tons; total tonnage in Moline Pool-----	2, 414
Davenport ice harbor: Government, none; private, 6 steamboats, 1 wharf boat, 2 pump boats, 24 barges, 5 quarter boats, 7 house boats, 15 launches, 1 derrick, 2 grasshoppers, 1 building boat, 4 launch houses, 1 old hull; 69 pieces, about 4,634 gross tons; total tonnage in Davenport ice harbor-----	4, 634
Milan (Illinois and Mississippi) Canal: Government, 8 towboats, 1 hydraulic dredge, 2 dipper dredges, 1 pile driver, 4 launches, 6 motor skiffs, 9 quarter boats, 2 store boats, 5 office boats, 32 barges, 4 fuel barges, 1 catamaran, 1 grasshopper, 28 pontoons, 13 skiffs, 1 old hull; 113 pieces, about 3,328 gross tons; private, 2 towboats, 3 motor skiffs, 1 house boat; 6 pieces, about 125 gross tons; total tonnage at Milan-----	3, 453
Keokuk, above and below lock: Government, 4 steamboats, 3 dipper dredges, 1 drill boat, 1 building boat, 1 grasshopper, 4 quarter boats, 2 dump boats, 5 office boats, 1 sounding boat, 24 barges, 6 coal barges, 6 motor boats, 1 inspection launch, 2 powder boats, 2 loading boats, 1 catamaran, 15 pontoons, 1 suction dredge; 80 pieces, about 5,721 gross tons; private, 7 launches, 2 barges; 9 pieces, about 120 gross tons; total tonnage at Keokuk-----	5, 841
Quincy Bay: Government, 3 steamboats, 1 building boat, 2 quarter boats, 8 barges, 1 coal barge, 1 inspection launch, 1 office boat; 17 pieces, about 2,372 gross tons; private, 4 steamboats, 2 building boats, 20 barges, 3 grasshoppers, 1 coal barge, 7 quarter boats, 3 sand elevators, 1 derrick boat, 72 launches; 113 pieces, about 3,777 gross tons; total tonnage in Quincy Bay-----	6, 149

Alton Slough: Government, 1 steamboat, 1 dipper dredge, 1 suction dredge, 15 pontoons, 1 building boat, 1 derrick boat, 1 pile driver, 1 grasshopper, 3 office boats, 3 quarter boats, 1 store boat, 4 fuel flats, 17 barges, 3 gasoline launches; 53 pieces, about 4,087 gross tons; private, 4 steamboats, 2 gasoline towboats, 1 building boat, 2 quarter boats, 1 house boat, 19 barges, 9 gasoline launches, <i>Huntress</i> naval boat, and 2 steam launches; 42 pieces, about 3,185 gross tons; total tonnage in Alton Slough.....	7,252
South Stillwater (St. Croix River): Government, 1 towboat, 1 suction dredge, 2 quarter boats, 1 store and office boat, 4 dump boats, 15 pontoons, 2 barges, 3 flats, 5 coal flats, 1 launch, 5 motor skiffs; 40 pieces, about 980 gross tons; total tonnage at South Stillwater.....	980
Lock No. 1, below: Government, 1 dipper dredge, 1 quarter boat, 1 barge; 3 pieces, about 445 gross tons; total tonnage below Lock No. 1.....	445

Total gross tonnage (short tons) at all the harbors..... 56,658

List of steamboats and barges passing through various bridges, 1915.

Locality.	Miles from St. Paul.	Steamboats.		Barges.	
		Up.	Down.	Up.	Down.
St. Paul Park.....	11	163	167	131	140
Hastings.....	28	137	137	120	117
Prescott.....	30	80	80	55	52
Reeds.....	78	561	603	81	98
Winona.....	116	142	145	99	95
La Crosse.....	143	198	202	247	230
Dubuque.....	265	328	333	346	345
Sabula.....	310	116	116	28	35
Clinton.....	327	493	501	492	509
Rock Island.....	363	471	477	335	328
Keithsburg.....	417	186	196	25	18
Burlington.....	441	425	401	151	161
Fort Madison.....	462	347	343	66	69
Kookuk.....	484	497	496	320	346
Quincy.....	521	509	507	458	488
Hannibal.....	540	216	218	80	61
Louisiana.....	568	164	145	72	62
Alton.....	652	1,035	1,037	118	146

NOTE.—Three lumber rafts down from Prescott to Fort Madison.

Internal revenue for the year ending Dec. 31, 1915, collected in districts bordering on the upper Mississippi River.

District.	Office.	Amount.
Minnesota.....	St. Paul.....	\$6,090,019.24
Second Wisconsin.....	Madison.....	1,957,008.94
Third Iowa.....	Dubuque.....	2,793,427.30
Fifth Illinois.....	Peoria.....	26,169,372.44
Eighth Illinois.....	Springfield.....	9,376,120.72
Fifteenth Illinois.....	East St. Louis.....	1,021,142.69
First Missouri.....	St. Louis.....	12,542,756.44
Total.....		59,919,987.77

Enrolled tonnage of upper Mississippi River boats, 1915.

Port.	Gross tonnage.	Vessels enrolled and licensed.
Milwaukee, Wis.....	322	6
Des Moines, Iowa.....	2,199	50
Chicago, Ill.....	5,152	44
St. Paul, Minn.....	2,569	39
St. Louis, Mo.....	23,368	315
Total.....	33,610	454

2. OPERATING AND CARE OF LOCK AND DRY DOCK AT KEOKUK, IOWA (FORMERLY DES MOINES RAPIDS CANAL).

The lock was open for navigation from July 1 to November 30, 1915, and from April 1 to June 30, 1916, a period of 244 days. At the close of the fiscal year the liabilities were \$4,143.21.

United States Civil Engineer M. Meigs, in local charge of lock and dry dock, reports as follows:

The Keokuk Lock was closed for navigation November 30, 1915, and again opened April 1, 1916, being open 244 days. One lockage was made March 28, 1916, and one December 4, 1915.

During the past season no boat has been delayed on account of the lock or appurtenances, and nothing about the operating machinery has failed at any time, except the runner in the 10-inch drainage pump broken by a block of wood getting in the suction.

In December, 1915, the collapsible dam at the foot of the lock was raised and the needles put on for the first time. Some of the needles were warped and difficult to make tight, and mud deposited about the trestles made the work of tightening the dam difficult. On the 21st the lock was finally pumped out and work of cleaning and painting the lower gates began. The buoyancy chambers in these gates are extremely difficult to clean, being cut up by partitions and many braces and angles. The interior was, however, thoroughly cleaned with scraper and brush and then treated with slaked lime on the bottom and along all the curved beams of the gate and wherever it could be placed. The flat surfaces are coated with whitewash of plain lime and water.

Outside the gates on the upper side and on the lower side to the 14-foot water line were sandblasted and given two coats of red lead, with a covering coat of Detroit graphite when out of water. The river rose and flooded the cofferdam before the third coat of graphite could be applied below the 14-foot water line.

The guard gate was removed from the upper end of the lock and docked to be painted on September 7. The entire gate, except inside the inclosed balance chambers, was sandblasted and the interior of the balance chambers cleaned with brush and scraper. The interior surfaces of these tanks were then painted with one coat of bitumastic cement and one of bitumastic enamel. On the outside this gate was sandblasted all over and then given two coats of Dutch Boy red lead, except the downstream face of the lock painted with one coat bitumastic cement and one of bitumastic enamel. On this lower face two strips 14½ feet wide and 15 feet high were painted with two coats of red lead to make a comparison with the bitumastic paint.

The dry-dock gate was painted on the downstream face with two coats Dutch Boy red lead and one coat of red lead and lampblack, except a strip 4 feet wide at bottom, which was painted with one coat of water-gas tar and two coats of coal tar. Two sand-blast machines were purchased and used in cleaning steel boats and structures about the lock.

The dry dock has been in constant use during the past year both for United States floating plant and for a few commercial boats that could not secure dockage elsewhere.

At the lower end of the dry dock 160 feet of the slope wall slid down into the dock and had to be replaced. In replacing the wall a heavy rock fill was built up at the toe of the wall after removing the earth that had slumped, and after covering this rock with macadam the slope wall was replaced. The expense of this was, at their suggestion, paid by the water power company.

The leakage through the expansion joints of the lock walls into the pipe tunnels 55 feet below water surface shows a constant reduction. In winter the contraction of the masonry increases the leakage, which in the middle of winter amounts to 38,000 gallons per day. In summer the expansion of the masonry reduces the leakage to 100 gallons per day.

APPROPRIATIONS AND ALLOTMENTS.

By various acts to June 30, 1912 (H. Doc. No. 1491, 63d Cong., 3d sess.), when new lock project was adopted..... \$1,348,103.88

By act approved Mar. 3, 1909, for fiscal year ending June 30:

1913	28,300.87
1914	19,257.49
1915	18,967.47
1916	23,602.79

Total expended..... 1,436,232.00

Expenditures for operating and care of lock at Keokuk, Iowa, for fiscal year ending June 30, 1916.

Office and administration.....	\$2,688.48
Operating and care of lock, current repairs, and painting.....	14,728.99
Dry-dock care and grading.....	2,224.88
House, dwelling for assistant in local charge of lock.....	3,960.89
Total.....	23,602.72

COMMERCIAL STATISTICS.

Traffic statement of Keokuk lock for calendar year 1915.

Designation.	Commercial.		Government.		Total.
	Up.	Down.	Up.	Down.	
Steamers.....number..	331	332	166	164	993
Barges.....do.....	76	106	244	241	668
Launches.....do.....	283	362	80	82	807
Passengers.....do.....	25,797	25,277	144	188	51,401
Merchandise.....short tons..	5,617	4,273	310	11,311	21,511
Grain.....bushels.....		115			115
Lumber.....feet b. m.....	7,100	16,000	75,000		98,100
Lockages.....number.....	406	580	216	214	1,496

3. OPERATING AND CARE OF MISSISSIPPI RIVER IMPROVEMENT AT MOLINE, ILL.

During the past year the lock was in operation from July 1 to December 2, 1915, and from March 25 to June 30, 1916, a period of 252 days. No serious accidents occurred to the lock and its accessories or to craft using it during the year.

The operating force, consisting of one lock master and two lockmen, in addition to actual operation, was employed at oiling, cleaning, painting, and making minor repairs to lock machinery as needed; mowing and caring for lawns and shrubbery; receiving, storing, and shipping lighthouse supplies; and in harvesting ice. Some minor repairs were made to lock gates and other fixtures.

The U. S. suction dredge *Geyser* was employed from September 23 to October 20, 1915, in removing 11,226 cubic yards of mud from the upper approach. Suction dredge *Mayon* was engaged as above from June 22 to end of year, her spoil being 10,034 cubic yards. The cost of dredging was \$1,992.12.

The outstanding liabilities are \$1,759.52.

ALLOTMENTS.

By act approved July 5, 1884, expended during fiscal year ending—	
June 30, 1908.....	\$4,789.03
June 30, 1909.....	10,000.00
By act of Mar. 3, 1909—	
June 30, 1910.....	9,908.15
June 30, 1911.....	5,163.58
June 30, 1912.....	13,203.16
June 30, 1913.....	5,908.79
June 30, 1914.....	8,568.48
June 30, 1915.....	7,830.80
June 30, 1916.....	7,822.09
Total.....	72,267.58

Summary of expenditures for operating and care of lock in the Mississippi River at Moline, Ill., for the fiscal year ending June 30, 1916.

Office and administration:		
Salaries.....	\$1, 180. 00	
Supplies.....	28. 38	
Miscellaneous.....	60. 00	
District office.....	185. 00	
		\$1, 403. 88
Lock and appurtenances:		
Labor of operating force.....	1, 781. 33	
Supplies.....	210. 82	
Repairs.....	399. 73	
Accessories.....	1, 491. 59	
		8, 883. 47
Dredging in approaches:		
Labor.....	1, 223. 95	
Supplies (including fuel and subsistence).....	678. 17	
Repairs.....	90. 00	
		1, 992. 12
Payments on 1915 liabilities.....		43. 12
Total.....		7, 822. 09

COMMERCIAL STATISTICS.

Traffic statement of Moline lock for calendar year 1915.

Designation.	Commercial.		Government.		Total.
	Up.	Down.	Up.	Down.	
Steamers.....number..	234	335	56	57	682
Barges.....do....	141	132	80	71	424
Launches.....do....	254	163	41	24	482
Passengers.....do....	18, 839	8, 800	48	31	27, 718
Merchandise, miscellaneous.....tons..	3, 269	13, 710	120	130	17, 229
Lockages.....number..	389	268	85	65	807

4. OPERATING SNAG BOATS AND DREDGE BOATS ON UPPER MISSISSIPPI RIVER AND TRIBUTARIES.

The work performed under this appropriation consists chiefly in the removal of snags, wrecks, rocks, and other obstructions to navigation. The operations extend from Minneapolis to the mouth of the Missouri River, a distance of 670 miles, and on the Illinois River from its mouth to La Salle, 223 miles. Work will also be performed in the improved or partially improved portions of the Minnesota, St. Croix, Chippewa, Black, Galena, and Rock Rivers.

There belongs to this work the snag boat *David Tipton* (formerly the *Colonel A. Mackenzie*), built in 1900, but dredges, drill boats, and tenders are borrowed from other works when required.

During the past year the snag boat was employed from July 1 to November 6, 1915, and from June 1 to 30, 1916, in removing snags and other obstructions, making inspections, placing buoys, lights, and day marks for the Lighthouse Establishment and otherwise assisting the interests of navigation on the upper Mississippi River between Minneapolis and the mouth of the Missouri River, and on the Illinois and St. Croix Rivers. During the winter of 1915-16 the snag boat lay in Moline Pool and received nominal repairs.

U. S. dredge *Keokuk*, with tender *Mac*, was employed from May 29 to June 30, 1916, in removing old sawmill cribs and patches of gravel from Muscatine Chute. Six cribs and one barge wreck were removed and 17,207 cubic yards of sand, gravel, and rock, at a cost of \$3,722.74. The spoil as deposited as a base for a closing dam, 1, sheet 52, and also for shore protection.

Summary of operations.

Snags, stumps, and piles removed.....	119
Leaning trees pulled back.....	94
Large cuts (over 8-inch diameter).....	107
Small cuts (under 8-inch diameter).....	83
Miles run.....	5,267

APPROPRIATIONS AND ALLOTMENTS.

Expended by act of—		By act of Aug. 11, 1888, expending during fiscal year ending—Contd.	
Mar. 2, 1867.....	\$96,000.00	June 30, 1896.....	\$25,000.00
July 25, 1868.....	26,000.00	June 30, 1897.....	25,000.00
Apr. 10, 1869.....	35,640.00	June 30, 1898.....	25,000.00
July 11, 1870.....	36,000.00	June 30, 1899.....	25,000.00
Mar. 3, 1871.....	42,000.00	June 30, 1900.....	24,844.00
June 10, 1872.....	42,000.00	June 30, 1901.....	25,000.00
Mar. 3, 1873.....	25,000.00	June 30, 1902.....	25,000.00
June 23, 1874.....	25,000.00	June 30, 1903.....	25,000.00
Mar. 3, 1875.....	25,000.00	June 30, 1904.....	25,000.00
Aug. 14, 1876.....	30,000.00	June 30, 1905.....	25,000.00
June 18, 1878.....	41,500.00	June 30, 1906.....	25,000.00
Mar. 3, 1879.....	20,000.00	June 30, 1907.....	25,000.00
June 14, 1880.....	8,000.00	June 30, 1908.....	25,000.00
Mar. 3, 1881.....	25,000.00	June 30, 1909.....	25,000.00
Aug. 2, 1882.....	25,000.00	June 30, 1910.....	25,000.00
Aug. 5, 1886.....	22,500.00	June 30, 1911.....	24,391.00
Aug. 11, 1888.....	25,000.00	June 30, 1912.....	23,442.40
By act of Aug. 11, 1888, expending during fiscal year ending—		June 30, 1913.....	26,557.60
June 30, 1890.....	25,000.00	June 30, 1914.....	24,475.17
June 30, 1891.....	25,000.00	June 30, 1915.....	23,457.05
June 30, 1892.....	25,000.00	June 30, 1916.....	19,429.41
June 30, 1893.....	25,000.00		
June 30, 1894.....	25,000.00		
June 30, 1895.....	25,000.00		
		Total.....	1,216,336.63

Summary of expenditures for operating snag boats and dredge boats on upper Mississippi River and its tributaries for fiscal year ending June 30, 1916.

Office expenses, superintendence, and contingencies.....	\$1,388.75
Labor.....	8,757.84
Subsistence.....	2,009.44
Fuel.....	2,542.16
Expense.....	684.60
Repairs.....	675.18
Dredging.....	3,371.44
	19,429.41

(Estimated liabilities, \$4,673.65.)

Commercial statistics will be found in report on the river between Missouri River and Minneapolis, Minn.

5. OPERATING AND CARE OF GALENA RIVER IMPROVEMENT, ILL.

During the past year the lock was open to navigation from July 1 to November 24, 1915, and from April 1 to June 30, 1916, a total of 207 days. There were five floods in Galena River preventing operation of the gates 11½ days. The gates were open from Mississippi River backwater 91 days. No dredging was done and repairs made by the lock force were very slight. A survey of the improvement was made in October, 1915, but owing to high water the usual spring soundings were not made. At the end of the fiscal year there were no outstanding liabilities.

APPROPRIATIONS AND ALLOTMENTS.

By act approved—

Sept. 19, 1890, purchase of improvement-----	\$100,000.00
July 5, 1884, expended during fiscal year ending—	

June 30, 1894-----	635.68
June 30, 1895-----	5,000.00
June 30, 1896-----	3,400.00
June 30, 1897-----	8,588.20
June 30, 1898-----	5,890.05
June 30, 1899-----	3,228.87
June 30, 1900-----	8,750.94
June 30, 1901-----	12,077.01
June 30, 1902-----	9,168.68
June 30, 1903-----	2,987.27
June 30, 1904-----	2,916.49
June 30, 1905-----	3,833.28
June 30, 1906-----	2,879.91
June 30, 1907-----	2,805.06
June 30, 1908-----	4,000.00
June 30, 1909-----	4,500.00
June 30, 1910 (act approved Mar. 3, 1909)-----	13,608.06
June 30, 1911-----	4,960.52
June 30, 1912-----	7,258.68
June 30, 1913-----	5,854.04
June 30, 1914-----	3,545.86
June 30, 1915-----	12,753.45
June 30, 1916-----	8,887.01

Total-----	232,775.16
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*Summary of expenditures for operating and care of Galena River, Ill. (lock),
for the fiscal year ending June 30, 1916.*

Office and administration-----	\$85.65
Lock and approaches-----	3,021.00
Dredging-----	279.67
Total-----	3,387.01

COMMERCIAL STATISTICS.

Traffic statement of Galena River improvement for calendar year 1915.

Designation.	Commercial.		Government.		Total.
	Up.	Down.	Up.	Down.	
Barges.....	133	128			271
Launches.....	2,444	2,407	18	17	4,886
Passengers.....	8,481	8,125	56	57	16,719
Merchandise.....	12	14			26
Sand and gravel.....	6,646				6,646
Wood.....	37				37
Lumber.....	6	31			37
Hay.....	2				2
Cement.....	5				5
Grain.....	1	1			2
Ore.....	20				20
Coal.....			12		12
Cattle.....	2				2
Lockages.....	1,356	1,437	14	13	2,820

Tonnage, commercial 6,749; Government 39; total 6,788. Ton-miles 40,747.

6. ILLINOIS & MISSISSIPPI CANAL, ILL. (CONSTRUCTION).

The banks of the canal in the eastern section were raised and reinforced at several points where threatened by floods.

There were expended during the year \$1,005.03.

Total expenditures to end of fiscal year 1916.

Preliminary and location surveys.....	\$44,318.18
Eastern section.....	3,172,000.39
Western section.....	1,968,288.92
Feeder.....	1,684,455.35
Rock River division.....	25,470.21
Rock River Pool.....	125,946.92
Rock River Lock.....	75,051.00
Milan section.....	548,252.88
Grand total.....	7,648,783.85

APPROPRIATIONS.

Aug. 2, 1882 (survey).....	\$30,000.00
Aug. 5, 1886 (examination).....	15,000.00
Sept. 19, 1890.....	500,000.00
July 13, 1892.....	500,000.00
Aug. 18, 1894.....	190,000.00
June 3, 1896.....	45,000.00
June 4, 1897 (sundry civil act).....	875,000.00
July 1, 1898 (sundry civil act).....	1,427,740.00
Mar. 3, 1899 (sundry civil act).....	700,000.00
June 6, 1900 (sundry civil act).....	1,000,000.00
Mar. 3, 1901 (sundry civil act).....	975,000.00
June 28, 1902 (sundry civil act).....	733,220.00
Mar. 3, 1905.....	300,000.00
June 30, 1906 (sundry civil act).....	200,000.00
June 25, 1910.....	175,000.00
Feb. 27, 1911.....	125,000.00
Total of appropriations.....	7,690,960.00
Transferred under authority of the act of Mar. 4, 1915.....	124,890.00
Net total.....	7,566,070.00
Received from all other sources, June 30, 1916.....	91,733.48
Grand total.....	7,657,803.48

¹ For Rock River Lock.

7. OPERATING AND CARE OF ILLINOIS & MISSISSIPPI CANAL.

Milan section.—During the past year the Milan section around the lower rapids of Rock River and extending in Rock River to Lock 29 was open to navigation from July 1 to December 5, 1915, and from April 13 to June 30, 1916, a period of 237 days.

During the calendar year 1915 boats, barges, and launches, etc., originating in this section to the number of 2,454 passed through, carrying 3,060 short tons of freight and 8,709 passengers. The traffic was very small and largely local, but it is believed that when the Illinois & Michigan Canal is rebuilt a very considerable tonnage of many commodities will result to and from Chicago and the Mississippi River.

The regular force cared for plant, operated locks and bridges, made small repairs to cribs, telephone lines, and signal devices, and, with extra help, removed mud from lock gates, cleaned up canal banks and South Slough.

Suction dredge *Geyser* was employed September 9 to 21, 1915, dredging approach to Lock 32 in the Mississippi River; between May 7 and 19, 1916, in vicinity of Lock 30; and from May 20 to 29, 1916, removing obstructions below Lock 29. The cost of this dredging was \$4,541.01.

In February, 1916, an ice gorge in Mill Creek did some damage by flooding the village of Milan and adjacent lands on both sides of South Slough. On February 2, 1916, due to backwater in the Mississippi River and a flood in Rock River, the water at Lock 30 reached the highest recorded stage (136.7), and lands above the lock as far as Case Creek were flooded not only on that day but for many days before and subsequently.

Four hundred tons of ice was harvested for use of Government employees. The receipts for ice privileges were \$170.

The outstanding liabilities June 30, 1916, were \$1,200.

Dredging statement from completion of improvement of Milan section.

Designation.	During fiscal year 1916.	Totals to June 30, 1916.
	<i>Cu. yds.</i>	<i>Cu. yds.</i>
Upper approach to Lock 30.....	1,565	17,568
In chamber of Lock 30.....	197	1,577
Trunk of canal between Lock 30 and Mill Creek.....	598	32,392
Trunk of canal below Lock 31.....		2,654
Trunk of canal in Silver Lake Harbor.....		9,430
Trunk of canal, Silver Lake Harbor to Martins Lane.....		27,994
Bar below Lock 32.....	3,053	104,557
In Rock River pool below Lock 29.....	7,822	90,038
In Rock River pool at Andersons Island.....		73,797
In Rock River pool at Blossomburg Landing.....		5,000
In Rock River pool at Hilliers Crossing.....		26,951
In Rock River pool just above Lock 30.....		15,146
Mud deposited above Mill Creek sluice gates.....		1,584
Total.....	13,235	405,006

Summary of expenditures of Milan section for fiscal year ending June 30, 1916.

Office and administration:		
Salaries, including district office.....	\$1, 300. 00	
Miscellaneous	64. 55	
		\$1, 364. 55
Canal, locks, and bridges:		
Labor of operating force.....	5, 134. 41	
Supplies	159. 70	
Current repairs.....	3, 481. 76	
		8, 775. 87
Dredging:		
Labor and subsistence.....	3, 278. 23	
Supplies and fuel.....	314. 72	
Current repairs.....	948. 03	
		4, 541. 01
Total.....		14, 681. 43

Eastern and western sections and feeder.—These portions of the canal were open to navigation from July 1 to December 5, 1915, and from April 13 to June 30, 1916, a period of 237 days. Work during the year has consisted in operating the locks, patrolling, revetting and strengthening the banks, repairing breaks, repairing boats and barges, caring for structures, mowing weeds, and miscellaneous items of maintenance.

On June 30, 1916, the outstanding liabilities were \$3,442.38.

There were received from ice privileges \$351.03.

Mr. L. L. Wheeler, the assistant in local charge, states:

A large amount of work has been done during the year in cleaning out seep ditches and dredging new ditches to improve drainage conditions.

At the posthouse, mile 15, 5,887 concrete line fence posts and 384 concrete telephone poles were made.

A total of 3,107 tons of road gravel and 8,230 tons of towpath gravel was loaded on barges and used in graveling approaches to bridges and towpath along the entire canal. All of this gravel was from pits miles 17, 22, 23, and 26, eastern section.

Bank reinforcing to the amount of 7,600 cubic yards was done on the canal aside from that done with the earth excavated by the two excavators. Twenty stations reinforced by dredge, mile 29, were leveled, moving 540 cubic yards of earth. By the two excavators 10,100 cubic yards of material was removed from seep ditches and used in reinforcing banks.

A total of 1,031 tons of ice was harvested and stored in the various ice houses along the canal. Five loads of peat was hauled from mile 20 to mile 17 for packing ice.

One thousand two hundred and twenty-five young catalpa trees, 181 young walnut trees, and 22 young hackberry trees were transplanted from nurseries to various miles along the canal. A large amount of work was done during the winter and spring grubbing out underbrush and trimming trees. The brush was piled and burned.

A self-registering water gauge was installed in Rock River at south end of Sterling Dam.

All launches were taken to Sterling for the winter. During the winter and spring a large amount of repair work was done on power skiffs and launches. Six of the 6-horsepower engines were given a brake test to determine the horsepower developed. Thirteen power skiffs were taken from the warehouse, launched, outfitted, and placed in commission April 6, 1916, and taken to their various places for the season's work. The outside of cabin and ceiling of office boat *Rambler* was painted.

Statement of expenditures of main canal, feeder, and Rock River Lock for fiscal year ending June 30, 1916.

Office and administration:

District office	\$2,422.25
Salaries	9,508.00
Extra labor	14.34
Supplies	79.69
Miscellaneous	860.49

Canal and locks:

Regular employees	50,022.82
Extra labor	20,418.73
Accidental injuries	847.50
Miscellaneous supplies	4,396.05
Repairs	2,699.17

\$12,384.77

78,883.77

Total 90,768.54

ALLOTMENTS.

Designations.	Millan section.	Feeder, eastern and western sections.	Total for entire canal.
By act of July, 1884, expended from June 30, 1902 (8 years).....	\$39,324.89		\$39,324.89
June 30, 1903.....	11,388.94		11,388.94
June 30, 1904.....	13,186.47		13,186.47
June 30, 1905.....	13,601.98		13,601.98
June 30, 1906.....	9,694.47		9,694.47
June 30, 1907.....	8,423.46		8,423.46
June 30, 1908.....	18,428.19	\$38,005.92	99,424.11
June 30, 1909.....	19,700.00	170,398.93	190,098.93
June 30, 1910 (act of Mar. 3, 1900).....	18,908.01	172,755.80	191,663.81
June 30, 1911.....	28,883.39	168,537.78	197,401.15
June 30, 1912.....	17,811.97	170,299.40	188,111.37
June 30, 1913.....	30,913.88	173,585.95	204,499.83
June 30, 1914.....	30,947.53	111,085.98	132,083.49
June 30, 1915.....	18,993.31	114,649.21	133,642.52
June 30, 1916.....	14,681.43	90,768.54	105,449.97
Total.....	279,889.90	1,258,087.47	1,537,977.37

COMMERCIAL STATISTICS.

Traffic statement for Illinois & Mississippi Canal (entire canal) for calendar year 1915.

Designation.	Commercial.		Government.		Total.	
	East.	West.	East.	West.		
Steamers.....	number..	38	32	180	168	415
Barges.....	do.....	114	123	590	548	1,375
Launches.....	do.....	1,794	1,761	1,960	1,899	7,394
Passengers.....	do.....	6,527	6,512	5,813	5,502	24,354
Miscellaneous freight.....	tons.....	34	69	268	60	426
Grain.....	do.....	6,829	440			7,269
Rock.....	do.....			60	190	250
Lumber.....	do.....	2	20	106	150	278
Coal.....	do.....	28	194	1,375	1,511	3,108
Earth.....	do.....			485	1,850	2,335
Concrete.....	do.....			107	1,070	1,177
Gravel.....	do.....	1,343	2,120	96	13,120	16,669
Clam shells.....	do.....		160			160
Machinery.....	do.....		40	155	216	411
Piling.....	do.....			47		47
Brush.....	do.....			69	4	73
Rope.....	do.....			6		6
Ice.....	do.....			5	62	67
Lockages.....	number..	4,356	4,764	8,371	3,530	16,021

Commercial.....	Tons.	11,279
Government.....		20,997
Total.....		32,276
Total ton-miles.....		1,055,883

8. ILLINOIS AND MISSISSIPPI CANAL, ILL. (IMPROVEMENT).

The river and harbor act of February 27, 1911, appropriated \$125,000 for "Improving Illinois and Mississippi Canal by raising Aqueduct 1, Lock 4, one highway bridge and approaches, and the banks of the canal where the canal crosses East Bureau Creek, just below the Chicago, Rock Island & Pacific Railway bridge across the same stream, \$125,000." A tentative project was submitted, which was approved April 24, 1911. (Report Chief of Engineers for 1911, p. 1971.) A survey was made and a further project was presented, the details of which and existing conditions are shown in Report of Chief of Engineers for 1912, page 2178.

APPROPRIATIONS.

Feb. 27, 1911	-----	\$125,000
59091°—ENG 1916—167		

IMPROVEMENT OF RIVERS AND HARBORS IN THE ST. PAUL, MINN., DISTRICT.

REPORT OF MAJ. E. D. PEEK, CORPS OF ENGINEERS.

IMPROVEMENTS.

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5. Mississippi and Leech Rivers, Minn.	2641	11. Zippel Bay, Lake of the Woods, Minn.	2646
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FOR DESCRIPTION OF IMPROVEMENT IN THIS DISTRICT, SEE PAGES 1103 TO 1130.

1. MISSISSIPPI RIVER BETWEEN ST. PAUL AND MINNEAPOLIS, MINN.

CONSTRUCTION OF LOCK AND DAM NO. 1.

Dam.—Not until August was the river low enough to commence closing the gap in the upper cofferdam. This opening was about 120 feet wide, with an average estimated depth of 15 to 18 feet. The flow of practically the whole river passed through this space, and the current was very swift. By dumping rock at each end of the opening, the current was sufficiently checked to allow piles to be driven from a floating driver, and by working the rock dumping and the pile driving alternately the gap was closed without excessive head against the partly filled coffer. As soon as the upper cofferdam was completed, the lower one was constructed without difficulty. The board of Engineer officers, convened by Special Orders, No. 15, Office Chief of Engineers, 1915, met and examined the work, and decided to rest that portion of the dam and apron not yet completed upon round piles, to be driven 3 feet center to center under the dam proper, and 4 feet center to center under the apron, the spaces between the piles to be filled with rock; a steel sheet piling cut-off wall to be driven as deep as possible along the upstream face of the dam in continuation of that already driven. The steel and round piles are all driven and about 80 per cent of the latter cut off to the proper height. About 80 per cent of the rock filling is placed. Late

in March backwater from the Minnesota River drowned the work, and at the close of the year the water was still too high to allow resumption. The dam is 92 per cent completed.

Lock.—Emptying valves, with operating machinery, were installed in the lower gates. Stop waters at heel of each leaf were placed, adjusted, and grouted. Maneuvering machinery for both upper and lower gates was installed and gratings placed. The lock is 98 per cent completed.

Power-house foundation.—No work done. The power-house foundation is 98 per cent completed. The project, as a whole, is 93 per cent completed.

Flowage rights.—Negotiations were continued with the various owners of the lands involved and deeds were obtained to the following:

	Acreage.
City of Minneapolis, through its board of park commissioners.....	100.9
The United Church Hospital Association.....	.28
St. Mary's Hospital.....	.5
George Peterson and wife (2 lots).....	.5
University of Minnesota.....	1.47
Total	103.65

The city of St. Paul has, by special ordinance, agreed to deed the flowage right required on city lands in exchange for part of the Government property at Lock and Dam No. 2, but the necessary papers have not yet been executed. Condemnation proceedings will shortly be instituted for the flowage rights not yet obtained. The expenditures during the year were \$148,447.63 for new work.

The following are some of the items of work done:

Filling and banking cofferdam.....	cubic yards	21,000
Rock quarried.....	do	14,930
Rock filling, dam foundation.....	do	5,668
Number of wooden piles driven (sheet and round).....		2,260
Number of steel-sheet piles driven.....		284

This work is being done by hired labor with Government plant.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 489).....	\$1,406,457.00
Present project:	
June 25, 1910.....	\$59,543.00
June 25, 1910.....	600.00
Feb. 27, 1911.....	250,000.00
July 25, 1912.....	200,000.00
Mar. 4, 1913.....	185,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	150,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	65,000.00
Mar. 4, 1915 (allotted Jan. 7, 1916).....	75,000.00
July 27, 1916.....	170,000.00
	1,155,143.00
Total of appropriations	2,561,600.00
Receipts from sales.....	1,893.80
Grand total	2,563,493.80

¹ This amount is exclusive of the appropriation of \$25,000 by the act of Mar. 3, 1873, which was not used and turned back into the Treasury in 1885, but does include \$49,877.67 of the appropriation of July 13, 1892, for section from Minneapolis to Missouri River, allotted to this work by act of Aug. 18, 1894.

COMMERCIAL STATISTICS.

None, the river being practically in its original condition, with the added obstruction of the partially demolished Dam No. 2.

2. OPERATING AND CARE OF LOCK AND DAM NO. 2, MISSISSIPPI RIVER, BETWEEN ST. PAUL AND MINNEAPOLIS, MINN.

Operations during the year consisted of care and maintenance of plant and property. There were no lockages, the lock being out of commission. The expenditures during the year were \$450.04, for care of property.

The outstanding liabilities at the close of the year were \$10.

EXPENDITURES.

During fiscal year:

1908	\$5,578.45
1909	1,828.83
1910	1,697.82
1911	1,520.35
1912	2,377.12
1913	601.08
1914	455.60
1915	360.00
1915	450.04
Total	14,867.29

COMMERCIAL STATISTICS.

For commercial statistics see Mississippi River between St. Paul and Minneapolis, Minn.

3. RESERVOIRS AT HEADWATERS OF MISSISSIPPI RIVER.

During July and August the temporary wooden covers over the lock-gate operating cable conduits at Sandy Lake Dam were replaced by steel plates. Flowage rights were acquired on 34 acres affected by operation of the Leech Lake Reservoir. The work was carried on by hired labor with Government plant. The total expenditures for the year were for new work, as follows:

Steel cover plates, cable conduits, Sandy Lake Dam	\$617.53
Flowage rights, Leech Lake Reservoir	108.15
Total	723.68

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 492)	\$930,500.00
Present project:	
Mar. 3, 1899	\$210,000.00
June 13, 1902	250,000.00
Mar. 3, 1905	180,000.00
Mar. 2, 1907	145,000.00
June 25, 1910	61,200.00
Feb. 27, 1911	10,000.00
July 25, 1912	15,000.00
	851,200.00
Total of appropriations	1,781,700.00

Deduct amount expended for "Improving Mississippi River between Brainerd and Grand Rapids, Minn."	\$19,000.96	
Balance of acts of June 25, 1910, and Feb. 27, 1911, repealed by act of Mar. 4, 1915	69,844.33	
Transferred under act of Mar. 4, 1915	19,500.00	
		\$108,345.29
Net total		1,673,354.71
Receipts from sales		38.50
Grand total		1,673,393.21

COMMERCIAL STATISTICS.

For commercial statistics reference should be made to the reports of "Improving Mississippi River between Brainerd and Grand Rapids, Minn." and "Improving Mississippi and Leech Rivers, Minn."

4. OPERATING AND CARE OF RESERVOIRS AT HEADWATERS OF MISSISSIPPI RIVER.

Winnibigoshish, Leech Lake, Pokegama, Pine River, Sandy Lake, and Gull Lake Reservoirs were in operation during the entire year. Repairs were made to the dams, buildings, dikes, booms, roads, and telephone lines as required.

The following is a brief statement of the liabilities incurred during the year:

Operation and repairs to dams, quarters, and lines of communication	\$12,494.71
Hydrological observations	244.00
Administration, traveling expenses, etc.	5,298.07
Total	18,034.78

Of this amount \$868.99 was outstanding at the end of the year.

The following table shows the discharge and difference in storage for the year:

Reservoir.	Gauge in lake.			Average discharge.	Total storage June 30, 1916.	Increase (+) or decrease (—) in storage since June 30, 1915.
	Standard flowage line.	June 30, 1915.	June 30, 1916.			
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Cu. ft.-sec.</i>	<i>Cubic feet.</i>	<i>Cubic feet.</i>
Winnibigoshish ¹	14.20	11.50	13.51	638	41,550,000,000	+2,500,000,000
Leech ¹	5.74	4.49	5.20	398	29,600,000,000	+4,500,000,000
Pokegama.....	12.00	12.55	12.01	1,567	5,280,000,000	— 550,000,000
Sandy.....	11.00	10.85	10.70	336	3,000,000,000	— 100,000,000
Pine.....	18.50	15.35	18.13	243	7,500,000,000	+1,800,000,000
Gull.....	7.00	7.01	7.20	182	3,250,000,000	+ 150,000,000
Total.....					90,180,000,000	+15,300,000,000

¹ The water from these two reservoirs passes through Pokegama Reservoir.

Total average discharge from Pokegama, Sandy, Pine, and Gull, 2,317 cubic feet per second.

EXPENDITURES.

During fiscal year—		During fiscal year—	
1895-----	\$5, 704. 86	1907-----	\$18, 469. 55
1896-----	26, 801. 98	1908-----	16, 448. 92
1897-----	37, 155. 73	1909-----	27, 932. 08
1898-----	20, 497. 19	1910-----	35, 380. 62
1899-----	13, 925. 92	1911-----	43, 012. 34
1900-----	19, 378. 23	1912-----	48, 281. 31
1901-----	16, 655. 78	1913-----	48, 737. 21
1902-----	17, 576. 47	1914-----	33, 221. 90
1903-----	10, 854. 63	1915-----	20, 222. 72
1904-----	12, 658. 35	1916-----	18, 179. 32
1905-----	12, 855. 57		
1906-----	22, 268. 40	Total-----	528, 219. 08

COMMERCIAL STATISTICS.

For commercial statistics reference should be made to the reports on the improvement of the Mississippi River between Brainerd and Grand Rapids, Minn., and Mississippi and Leech Rivers, Minn.

5. MISSISSIPPI AND LEECH RIVERS, MINN.

The dredge *Manito* and fleet were employed during the working seasons. Numerous delays have been experienced on account of machinery breakdowns, which delays have materially reduced the yardage output. A total of 124,547 cubic yards was removed and 19 miles of river were worked over. The cuts were about 125 feet wide and 8 feet deep at bank-full stage. The gross cost per cubic yard for dredging was about 13 cents.

The following is a statement of the expenditures for the year, all for new work:

New plant-----	\$7, 337. 75
Renewals and additions-----	853. 32
Dredging-----	7, 890. 96
Repairs-----	4, 069. 42
Surveying and drafting-----	1, 663. 53
Engineering and superintendence-----	1, 029. 17
Total-----	22, 844. 15

This work was done by hired labor with Government plant.

APPROPRIATIONS.

Mar. 4, 1913-----	\$116, 000. 00
July 27, 1916-----	60, 000. 00
Total-----	176, 000. 00

COMMERCIAL STATISTICS.

Designation.	Unit.	Quantity.	Short tons.	Value.
Logs floated.....	Feet b. m.....	35,000,000	157,000	\$630,000
Dressed lumber.....	do.....	2,000,000	3,000	60,000
Cedar posts and poles rafted.....	Number.....	500,000	53,100	70,000
Ties rafted.....	do.....	200,000	20,000	75,000
Pulp wood rafted.....	Cords.....	8,000	4,000	36,000
Miscellaneous freight.....			900	45,000
Passengers.....	Number.....	6,730		
Receipts to passenger carriers.....				4,218

There are 8 steamboats operating on the section covered by this improvement; also about 80 gasoline tugs and launches, both pleasure and commercial craft.

The commerce on the rivers in this improvement is mainly that of floating loose pine logs and rafts of cedar posts and poles, ties, and pulp wood. The decrease in the season's tonnage from that of 1914 is due to a material falling off of the amount of pine logs floated. Tonnage of miscellaneous freight handled by boats has increased from 55 tons in 1914 to 900 tons. Prior to 1915 no data was obtained on the number of passengers carried. The number of launches and small tugs engaged in a general freight and passenger business is steadily increasing. A large percentage of farm produce, potatoes, hay, etc., grown in the locality is hauled to the railroads on the river. The locality seems to be just awakening to the value of water as a transportation agent.

6. MISSISSIPPI RIVER, BETWEEN BRAINERD AND GRAND RAPIDS, MINN.

The dredge and snag boat *Oriole* worked downstream from Grand Rapids. During 1915, 93 miles of channel were cleared of 4,368 snags, after which the dredge was put in winter quarters. Some minor revetment work was done at Potters Chute, near Grand Rapids, and a brush and stone dam, 147 feet in length, was built at Ox-bow Rapids, near Libby.

The following is a statement of expenditures during the year:

Snagging.....	\$1,955.44
Wing dams, etc.....	963.42
Repairs.....	963.61
Engineering and superintendence.....	481.05
Total.....	4,363.52

The work was done by hired labor with Government plant.

APPROPRIATIONS.

Prior to June 25, 1910 (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 488).....	\$19,000.96
Present project:	
June 25, 1910.....	\$22,555.00
Oct. 2, 1914 (allotted Oct. 7, 1914).....	4,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915).....	6,000.00
July 27, 1916.....	2,000.00
	34,555.00
Total.....	53,555.96
Receipts from sales.....	69.78
Grand total.....	53,625.74

COMMERCIAL STATISTICS.

Designation.	Unit.	Quantity.	Short tons.	Value.
Logs floated.....	Feet, b. m.....	75,000,000	340,000	\$1,350,000
Cedar posts and poles rafted.....	Number.....	60,000	15,000	20,000
Ties rafted.....	do.....	70,000	7,000	28,000
Pulp wood.....	Cords.....	8,000	4,000	40,000
Freight, miscellaneous.....			700	35,000
Passengers.....	Number.....	1,000		
Receipts to passenger carriers.....			A.....	1,000

There is one steamboat operating on the section covered by the improvement, which made, last season, round trips at least once a week between Aitkin, Minn., and a landing near Jacobson, Minn. About 19 gasoline launches and one gasoline stern-wheel boat operate at different points along the river, being both pleasure and commercial craft.

7. ST. CROIX RIVER, WIS. AND MINN.

No work was done on the project during the year. The sum of \$112.69 was expended in making a preliminary examination as called for in river and harbor act of July 25, 1912.

APPROPRIATIONS.

June 18, 1878.....	\$10,000	Mar. 3, 1899.....	\$9,000
Mar. 3, 1879.....	8,000	June 13, 1902.....	2,000
June 14, 1880.....	10,000	Apr. 28, 1904 (allotment of	
Mar. 3, 1881.....	8,000	June 10, 1904).....	885
Aug. 2, 1882.....	30,000	Mar. 3, 1905.....	4,000
July 5, 1884.....	9,000	Mar. 2, 1907.....	4,000
Aug. 5, 1886.....	7,500	Mar. 3, 1909 (allotment of	
Aug. 11, 1888.....	10,000	Apr. 17, 1909).....	8,600
Sept. 19, 1890.....	8,000	June 25, 1910.....	4,000
July 13, 1892.....	8,000	Feb. 27, 1911.....	3,600
Aug. 18, 1894.....	4,000		
June 3, 1896.....	15,000	Total.....	158,585

COMMERCIAL STATISTICS.

Lumber:		
Rafted.....	feet b. m.....	4,484,259
Weight.....	short tons.....	6,726
Value.....		\$134,530
Lath:		
Rafted.....	number.....	1,731,300
Weight.....	short tons.....	446
Value.....		\$6,470
Passengers carried.....	number.....	8,500
Steamboats (rafting).....	do.....	2

8. MINNESOTA RIVER, MINN.

No work was done during the year. The sum of \$4.72 was expended in connection with a public hearing held at Shakopee.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 487) -- \$127, 500.00
 Present project:

June 3, 1896	\$4, 000. 00	
Mar. 3, 1899	1, 000. 00	
June 13, 1902	2, 500. 00	
Mar. 3, 1905	3, 000. 00	
Mar. 2, 1907	2, 000. 00	
Mar. 3, 1909 (allotment of Apr. 17, 1909)	2, 000. 00	
June 25, 1910	2, 200. 00	
Feb. 27, 1911	2, 000. 00	
		18, 700. 00
Total of appropriations		146, 200. 00
Returned to Treasury (unexpended balance of act of June 13, 1902)		21. 32
Grand total		146, 178. 68

COMMERCIAL STATISTICS.

The river is used by excursion steamers between the mouth and Shakopee, no freight having been carried on this section of the river for many years.

9. RED RIVER OF THE NORTH, MINN. AND N. DAK.

The dredging fleet and property were cared for at Grand Forks until all had been sold or transferred to other works. Since then operations were confined to reading the gauge at Grand Forks.

The expenditures during the year were as follows:

Care of fleet and property	\$761. 87
Reading gauges at Grand Forks	31. 50
Total	793. 37

APPROPRIATIONS.

Aug. 14, 1876	\$10, 000. 00	Mar. 3, 1905	\$9, 000. 00
June 18, 1878	30, 000. 00	Mar. 2, 1907	15, 000. 00
Mar. 3, 1879	25, 000. 00	Mar. 3, 1909 (allotment of Apr. 17, 1909)	7, 500. 00
June 14, 1880	20, 000. 00	June 25, 1910	7, 500. 00
Mar. 3, 1881	20, 000. 00	Feb. 27, 1911	7, 500. 00
Mar. 3, 1881	18, 000. 00	July 25, 1912	17, 000. 00
Aug. 2, 1882	30, 000. 00	Mar. 4, 1913	7, 500. 00
Aug. 2, 1882	10, 000. 00		
July 5, 1884	10, 000. 00	Total of appropriations	385, 623. 00
Aug. 11, 1888	20, 000. 00	Amounts transferred under act of Mar. 4, 1915	7, 000. 00
Sept. 19, 1890	25, 000. 00		
July 13, 1892	25, 000. 00	Net total	378, 623. 00
Aug. 18, 1894	15, 000. 00	Receipts from sales	229. 14
June 3, 1896	20, 000. 00		
Mar. 3, 1899	25, 000. 00	Grand total	378, 852. 14
June 13, 1902	10, 000. 00		
Apr. 28, 1904 (allotment of June 10, 1904)	1, 623. 00		

COMMERCIAL STATISTICS.

One 30-foot gasoline boat distributed 125 tons of miscellaneous freight, valued at \$10,000, to various points along the Red River of the North between Grand Forks and the international boundary. There was no commerce on Red Lake River.

10. WARROAD HARBOR AND WARROAD RIVER, MINN.

At the beginning of the fiscal year ordinary repairs to the dredge *Warroad* were completed and maintenance dredging in the channel was commenced on July 12. Portions of the channel aggregating 3,000 feet in length and 125 feet in width were dredged to a depth of 8 feet at assumed mean low water. In this work 35,615 cubic yards of sand and clay were removed and an average increased depth of 3 feet obtained. Due to the silting up of the channel in the lake, the controlling depth at the end of the fiscal year was 4.5 feet, referred to mean low water. But as the stage of the lake is now very high, the gauge being 10.4, the present controlling depth is 10.9 feet, 2.9 feet more than the project depth. Dredging was suspended on September 7 and minor repairs made to the dredge hull and stern wheel in preparation for trip to Zippel Bay, made September 11. The dredge *Warroad* returned to Warroad October 10, was laid up in winter quarters, and the crew disbanded on October 14. A hydrographic survey was made in March, 1916, to determine the present condition of the channel and turning basin. In May additional piles were driven at the mooring berth for the dredge, minor repairs made to the dredge, and the dredge was temporarily transferred to the United States Lake Survey office, to be used as quarters by a survey party. This improvement is carried on by hired labor with Government plant. The expenditures during the year were as follows:

Dredging	\$2, 528. 20
Care and repair of plant	947. 52
Survey	227. 01
Total	3, 700. 73

APPROPRIATIONS.

Mar. 3, 1899	\$3, 000
June 13, 1902	45, 000
Mar. 3, 1905	35, 000
Mar. 2, 1907 (allotment of Jan. 12, 1909)	4, 000
Mar. 3, 1909 (allotment of Apr. 17, 1909)	4, 000
June 25, 1910	7, 700
July 25, 1912	13, 200
Mar. 4, 1913	2, 000
Oct. 2, 1914 (allotment of Oct. 7, 1914)	2, 000
Mar. 4, 1915 (allotment of Apr. 2, 1915)	2, 000
July 27, 1916	2, 000
Total	119, 900

COMMERCIAL STATISTICS.

Description.	Short tons.	Value.
Logs and poles towed.....	10,080	\$35,840
Fish.....	1,462	292,400
Miscellaneous freight.....	748	44,880
Total.....	12,290	373,120

Passengers carried, 10,250.

The above commerce was carried by 2 steamers, 13 gasoline launches (freight and passenger), 11 gasoline launches (passenger), and 3 sailboats (fishing).

11. ZIPPEL BAY, LAKE OF THE WOODS, MINN.

In September and October 100 cords of brush were cut and tied into fascines, and 432 cubic yards of rock collected. For this work the dredge *Warroad* was used to transport and quarter the crew. In December this material was placed on the top of the jetty for 1,500 feet of its length to repair damage done by storms. A proportionate share of the expense of repair and care of the dredge *Warroad* was charged to this appropriation. This improvement is carried on by hired labor with Government plant. The expenditures during the year were for maintenance, as follows:

Repairs to jetty.....	\$1,285.39
Repair and care of dredge <i>Warroad</i> and fleet.....	579.68
Total.....	1,865.07

APPROPRIATIONS.

Feb. 27, 1911.....	\$27,781.00
Mar. 4, 1913.....	1,000.00
Oct. 2, 1914 (allotment of Oct. 7, 1914).....	1,000.00
Mar. 4, 1915 (allotment of Apr. 2, 1915).....	1,000.00
July 27, 1916.....	1,000.00
Total.....	31,781.00

COMMERCIAL STATISTICS.

Description.	Short tons.	Value.
Fish.....	250	\$50,000
Miscellaneous freight.....	525	31,560

Passengers carried, 2,540.

The above commerce was carried by 1 steamer, 6 gasoline passenger and freight launches, 50 gasoline passenger pleasure launches.

12. LAKE TRAVERSE, MINN. AND S. DAK.

No work was done nor expenditures made.

APPROPRIATIONS.

July 25, 1912.....	\$7,510
Transferred by river and harbor act of Mar. 4, 1915.....	7,040
Total.....	470

COMMERCIAL STATISTICS.

Description.	Short tons.	Value.	Description.	Short tons.	Value.
Wheat.....	5,878	\$231,225	General merchandise.....	55	\$3,200
Barley.....	1,501	34,398	Lumber.....	1,500	10,020
Oats.....	694	16,049	Cement.....	25	450
Rye.....	114	3,335	Bricks.....	5	165
Flax.....	78	7,228	Total.....	10,000	307,423
Coal.....	150	1,253			

About 400 passengers were carried.

The above commerce was carried by two gasoline boats and two barges.

13. GAUGING MISSISSIPPI RIVER AND ITS TRIBUTARIES AT OR NEAR ST. PAUL, MINN.

Gauges were read at Montevideo and Mankato, on the Minnesota River, during the entire year; at Watson, on the Chippewa River, a tributary of the Minnesota River, during the open season, and at Osceola, on the St. Croix River, during September and October, 1915. The work was done by hired labor. The total expenditures during the year were \$258.66. The outstanding liabilities at the close of the year were \$61.34.

EXPENDITURES.

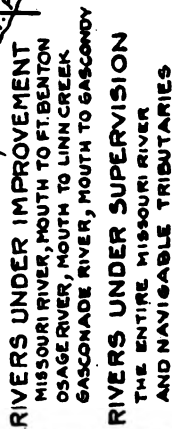
During fiscal year:

1890.....	\$600.00
1891.....	620.98
1892.....	1,133.85
1893.....	431.23
1894.....	592.06
1895.....	521.98
1896.....	500.00
1897.....	500.00
1898.....	500.00
1900.....	320.06
1903.....	500.00
1904.....	98.67

During fiscal year—continued.

1905.....	\$192.15
1908.....	641.84
1909.....	549.81
1910.....	59.27
1912.....	270.78
1913.....	248.72
1914.....	180.50
1915.....	40.00
1916.....	258.66
Total expenditures....	8,760.46

SCALE (APPROXIMATE)



TO ACCOMPANY THE ANNUAL REPORT FOR
THE FISCAL YEAR ENDED JUNE 30-1916

J. F. McFarlane
LIEUT. COL., CORPS OF ENGRS.

IMPROVEMENT OF RIVERS AND HARBORS IN THE KANSAS CITY,
MO., DISTRICT.

REPORT OF LIEUT. COL. J. F. MINDOE, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Missouri River, Kansas City to mouth.....	2649	5. Operating and care of lock and dam No. 1, Osage River.....	2682
2. Missouri River, Kansas City to Sioux City.....	2669	6. Gasconade River, Mo.....	2683
3. Missouri River, Sioux City to Fort Benton.....	2673	7. Kansas River, Kans.....	2686
4. Osage River, Mo.....	2679	8. Bank preservation, Fort Riley Military Reservation, Kans..	2687

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1130 TO 1160.

MISSOURI RIVER.

A general map of the Kansas City district showing Missouri River and tributaries is shown on plate 1.

In recent years Congress has made appropriations for improvement of the Missouri River in three sections, which makes it desirable to report separately for each section, as follows: 1. Kansas City to the mouth (392 miles); 2. Kansas City to Sioux City (415 miles); 3. Sioux City to Fort Benton (1,478 miles). The river from Kansas City to the mouth was under the local charge of Asst. Engineer G. C. Haydon, and from Kansas City to Fort Benton under the local charge of Asst. Engineer A. O. Rowse.

1. MISSOURI RIVER, KANSAS CITY TO THE MOUTH.

Floods.—The year 1915 is remarkable for prolonged high-water stages. The river passed the allowable working stage for revetment (5 feet above standard low water) March 25, 1915, and remained above this stage to October 25, 1915. (See pl. 3.)

The gauge at Kansas City gives the record of eight distinct waves beginning with the crest of April 15 and ending with the crest of August 19, 1915, the latter approximating and the others above standard high water. The highest water of the season at this location was on July 21, 1915, being 29 feet on the gauge; danger line is at 22 feet. On the lower section of the river the highest water occurred June 3, 1915, being 2 feet above the wave of July 21. After the cessation of the June rise very little damage to the improvement work was noted, but much damage was done to the work and river banks during the remainder of the high-water period. The damage to the improvement work is estimated at about 2 per cent. A number of the "bot-toms" were denuded of the top soil to a depth of 2 to 3 feet, and many sloughs or draws were cut across them, some of which are about 10 feet deep. During the season of 1916 the river has remained continuously above the working stage. Because of the above conditions but little work was done during the fiscal year.

Cut-offs.—Two cut-offs were made during the year, both across bends, the banks of which had been revetted. The first cut-off oc-

curring July 3, 1915, across the neck at Napoleon Bend (see pls. 12 and 13) from mile 340¹ to mile 330, the land distance between the two points being about 2 miles, hence the actual distance cut-off is about 8 miles. At time of the subsidence of fourth high wave, of the "June rise," there were no special indications of damage, the cut-off occurring at a time of the fifth high wave. The peculiarity of this cut-off is that it did not go through at the low-bank section, but some 500 feet downstream and across ground some 4 to 5 feet higher, thence back into the low ground and into an old lake drainage ditch. The river had begun to fall the day before the cut-off occurred, and the gauges at Kansas City (mile 390.7), Sibley (mile 350), and Waverly (mile 299) do not show any marked change as the fall at each place from July 3 to 4, 1915, was 1, 1.5, and 1.3 feet, respectively; then from July 4 to 5 the fall 1.7, 0.2, and 0.9 feet, respectively; the fall for the next 4 following days was from three to four tenths at each place when another rise began and reached the highest stage of the year at these gauge locations. After the water had subsided and was well within the banks, upon a comparison of two series of gauge readings in connection with the standard low-water plane as a base, it is noted that the water surface was lowered somewhat in excess of 3 feet at Napoleon, while at Kansas City and Waverly, at the same stage of river, there was no appreciable change before and after the cut-off. The second cut-off was at Saline City Bend (see pl. 16), but was not noted until August 1, 1915; in fact, this cut-off is more in the nature of a slough, as the main channel is still around the bend, and it is proposed to construct a closing dike as soon as the stage of river will permit.

The details of work done during the fiscal year are as follows:

Randolph Bend (left bank, mile 382; see pl. 9²).—Five thousand four hundred feet of standard revetment, at \$9.55 per linear foot. The contract is dated April 18, 1916, and is to be completed November 1, 1916, but on account of high water no work has been done.

Sissons Bend (left bank, mile 379; see pl. 10²).—One thousand feet of standard three-row dike, at \$14.25 per linear foot. The contract is dated June 1, 1915, and was to be completed April 19, 1916, but on account of high water no work has been done excepting the assembling of materials.

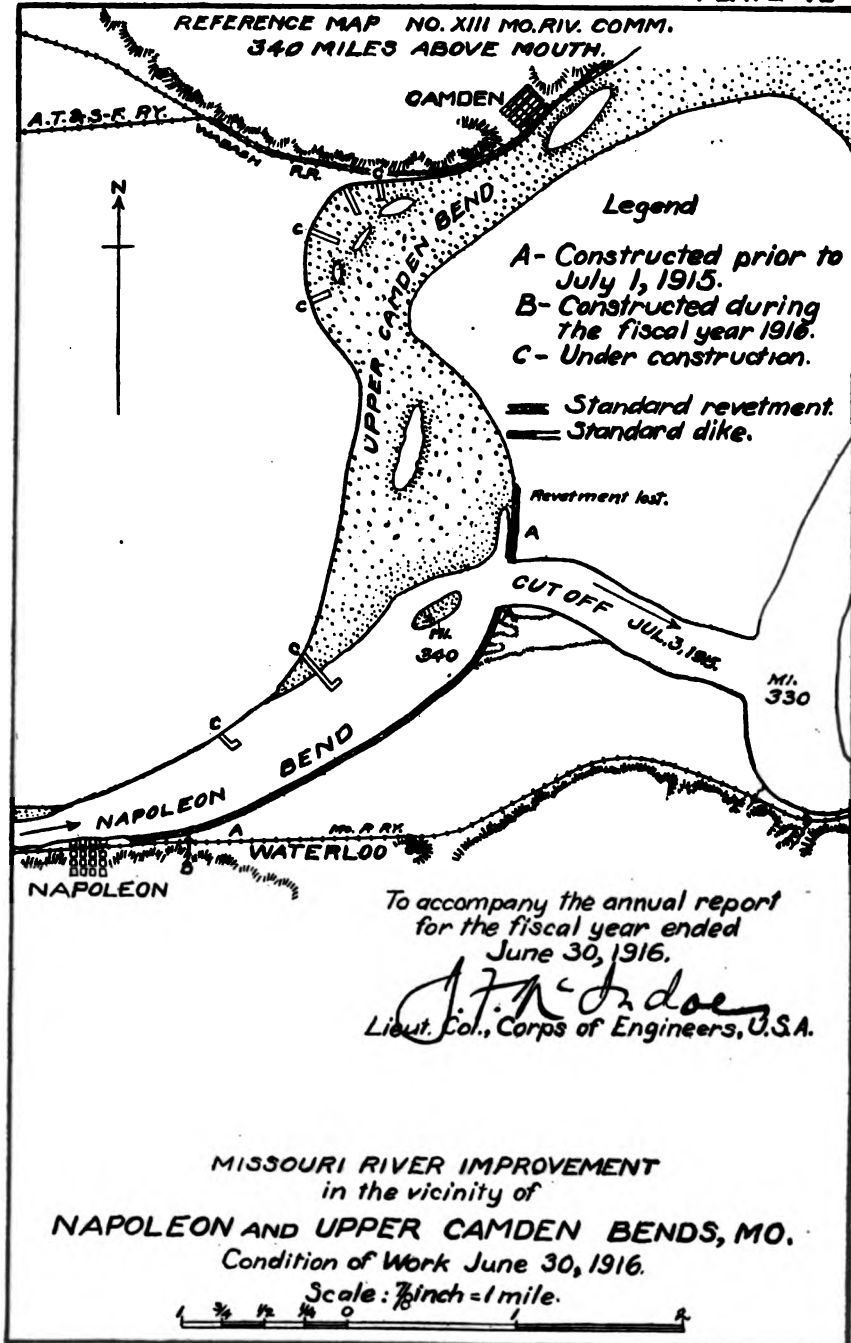
Blue Mills Bend (left bank, mile 371; see pl. 10²).—Three thousand two hundred feet of standard three-row dike, at \$14.25 per linear foot. The contract is dated June 1, 1915, and was to be completed April 19, 1916, but on account of high water no work has been done except the assembling of materials.

Jacksons Bend (right bank, mile 367; see pl. 11²).—Nine thousand feet standard revetment, at \$9 per linear foot. The contract is dated June 1, 1915, and was to be completed June 17, 1916, but on account of high water and a sand bar forming along the bank line no work has been done.

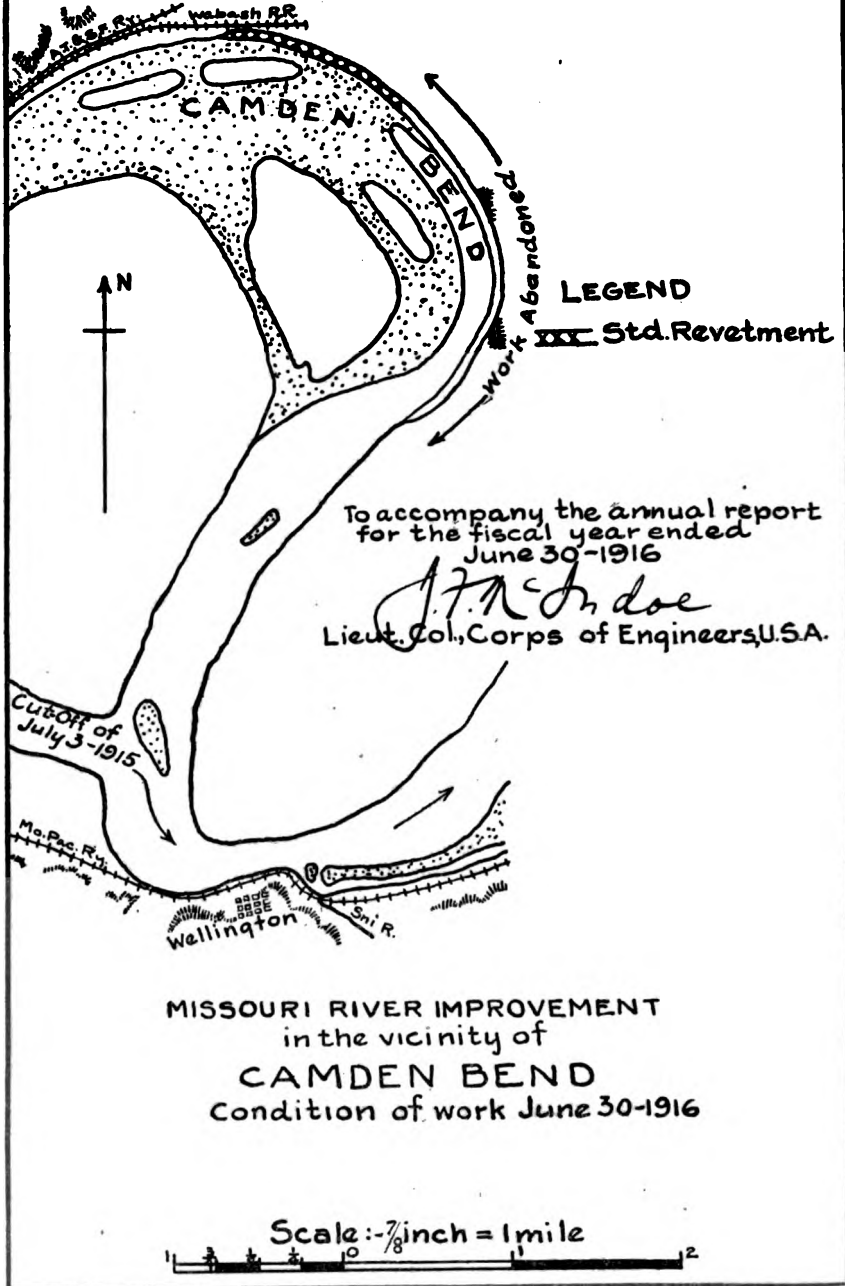
Napoleon Bend (left bank, mile 341; see pl. 12²).—Two thousand eight hundred and fifty feet of standard three-row dike, at \$13.48 per linear foot. The contract is dated June 12, 1915, and was to be completed July 7, 1916, but on account of the cut-off in this locality this contract will probably be terminated and no work done.

¹ Wherever in this report expressions like "mile 340" appear, the figure is the number of miles above mouth of river.

² Not printed.



REFERENCE MAP NO. XIII. MO. RIVER COMM
330 MILES ABOVE MOUTH



*Napoleon Bend (right bank, mile 340; see pl. 12¹).—*Seventeen thousand and forty feet of standard revetment, at \$10.09 per linear foot, unfinished contract from last year. The work done during the year consisted of 2,365 feet of bank graded and paved and 2,365 feet of mattress; this work progressed under the allowable 5-foot stage, which obtained due to a 3-foot lowering of the water surface on account of the cut-off. The contract was completed October 29, 1915, at a field cost of \$176,631.69. A cut-off at this locality caused the loss of about 3,675 feet of revetment at the lower end, and was the cause of erosion upstream from the head of the old work, which necessitated an upstream extension of 2,365 feet of revetment to bluff contact.

*Upper Camden Bend (left bank, mile 338; old distance, see pl. 12¹).—*Three thousand and fifty feet of standard 3-row dike, at \$13.48 per linear foot. The contract is dated June 12, 1915, and was to be completed July 7, 1916, but on account of a cut-off in this locality the contract will be terminated and no work done.

*Camden Bend (left bank, mile 333; old distance, see pl. 13¹).—*The work contemplated at this location was 19,000 feet of standard revetment by hired labor and Government plant. On July 1, 1915, there had been completed 6,280 feet. A cut-off, July 3, 1915, opposite this location caused a complete loss of this revetment and all preparatory work for the entire amount. This work was abandoned August 11, 1915, the field expenditures incidental thereto amounting to \$96,365.48.

*Opposite Waverly, Mo. (left bank, mile 299; see pl. 14¹).—*A system of three standard 3-row dikes, in all 3,500 feet, at \$13.70 per linear foot. The contract is dated June 17, 1915, and was to be completed July 7, 1916. Work began August 26, 1915, and that done during the year consisted of one dike (1,100 linear feet) completed November 7, 1915; one dike (740 linear feet) completed March 9, 1916, and one dike (1,000 linear feet) completed January 21, 1916. At the time of the ice break-up in January, 1916, about 600 feet of one dike was lost and an additional 660 feet was begun to replace this lost section. The work done was 340 feet of dike driven in place and 300 feet of mattress. The work is about 86 per cent completed. This system of dikes was built to rectify a crossing and to hold the channel along the revetment in the bend below.

*Bakers Bend (left bank, mile 295; see pl. 14¹).—*Ten thousand feet of standard revetment, at \$10.15 per linear foot; unfinished contract from last year, which has been extended for a reasonable time. Two months' work was done during the year and consisted of 2,710 feet of bank graded, 3,230 feet of mattress, and 3,225 feet of paving. Work is about 76 per cent completed.

*Bakers Bend (left bank, mile 293; see pl. 14¹).—*Five thousand feet of standard revetment, at \$8.55 per linear foot. The contract is dated June 17, 1915, and was to be completed July 6, 1916, but on account of high water no work has been done.

*Bakers Bend (right bank, mile 293; see pl. 14¹).—*Two thousand six hundred and sixty feet of standard 3-row dike at \$13.70 per linear foot. The contract is dated June 17, 1915; the work began September 24, 1915; and that done during the year consisted of one dike (1,750 linear feet), completed November 23, 1915, and one dike (910 linear feet), completed November 30, 1915, at a field cost of \$36,718.69.

This system of dikes, with the two completed July 24, 1914, was built to rectify a crossing by closing an auxiliary channel and completes such work at this locality. The upper one of the new dikes in Bakers Bend was breached 100 feet by drift during the rise of May, 1916.

*Bluffport Reach (right bank, mile 236; see pl. 15¹).—*A system of two 3-row standard dikes, in all 2,030 feet, by hired labor and Government plant. One dike (1,280 linear feet) was completed May 8, 1915, at a field cost of \$14,112.90; the second was under construction at time of June rise with 750 linear feet completed. It was found after the subsidence of high water that the additional 690 feet of piles driven in place at outer end of dike had been practically carried away, but that a sand bar had been made for this length which obviated the necessity of further extension. This system of dikes is considered as completed June 1, 1915, with total length of 2,030 linear feet at a field cost of \$31,026.36, which includes the cost of uncompleted portions which were lost.

*Euphrase Bend (right bank, mile 230; see pl. 16¹).—*A system of five 3-row standard dikes, in all 4,300 feet by hired labor and Government plant. One dike (720 linear feet) of this system is for closing a chute and the work of construction was begun July 6 and completed September 11, 1915, at a field cost of \$12,334.04. The remaining dikes of this system are for rectification of undesirable river width to hold the channel along the revetted left bank. The upper dike (750 linear feet), was begun November 22, 1915, and completed December 14, 1915, at a field cost of \$8,302.62. This work was suspended for the season with about 34 per cent completed. During the ice breakup of January, 1916, the upper dike was breached 220 feet and during the May rise the chute dike was breached 80 feet, due to heavy run of drift, both of which have been repaired.

*Euphrase Bend (left bank, mile 230; see pl. 16¹).—*Twelve thousand feet of standard revetment at \$8.34 per linear foot. The contract is dated June 12, 1915, and is to be completed October 7, 1916. Work began September 4, 1915, and that done during the year consisted of 5,650 feet of bank graded, 5,530 feet of mattress, and 5,005 feet of paving. Work is about 45 per cent completed.

*Euphrase Bend (left bank, mile 228; see pl. 16¹).—*A system of three 3-row standard dikes, in all 2,250 feet at \$12.95 per linear foot. The contract is dated June 12, 1915, and is to be completed October 7, 1916. On account of high water no work has been done.

*Nigger Bend (left bank, mile 222; see pl. 16¹).—*Six thousand five hundred feet of standard revetment by hired labor and Government plant. The plant is assembled awaiting the subsidence of high water, and the force is occupied in quarrying stone. The stone quarried and stored amounts to 6,158 cubic yards.

*Franklin Bend Chute (left bank, mile 204; see pl. 17¹).—*One thousand eight hundred and eighty feet of 3-row standard dike at \$20.10 per foot; unfinished work from last year by hired labor and Government plant. The work was completed October 27, 1915, and that done during the year consisted of 1,080 feet of dike driven in place (500 feet of which was to replace a section destroyed by high water of June, 1915), 1,080 feet of mattress, and 1,080 feet of bracing, at a field cost of \$37,785.85. The excessive cost of this dike is due to the replacing of 580 feet of

¹ Not printed.

REFERENCE MAP No. IX MO. RIV COMM.
222 AND 230 MILES ABOVE MOUTH.



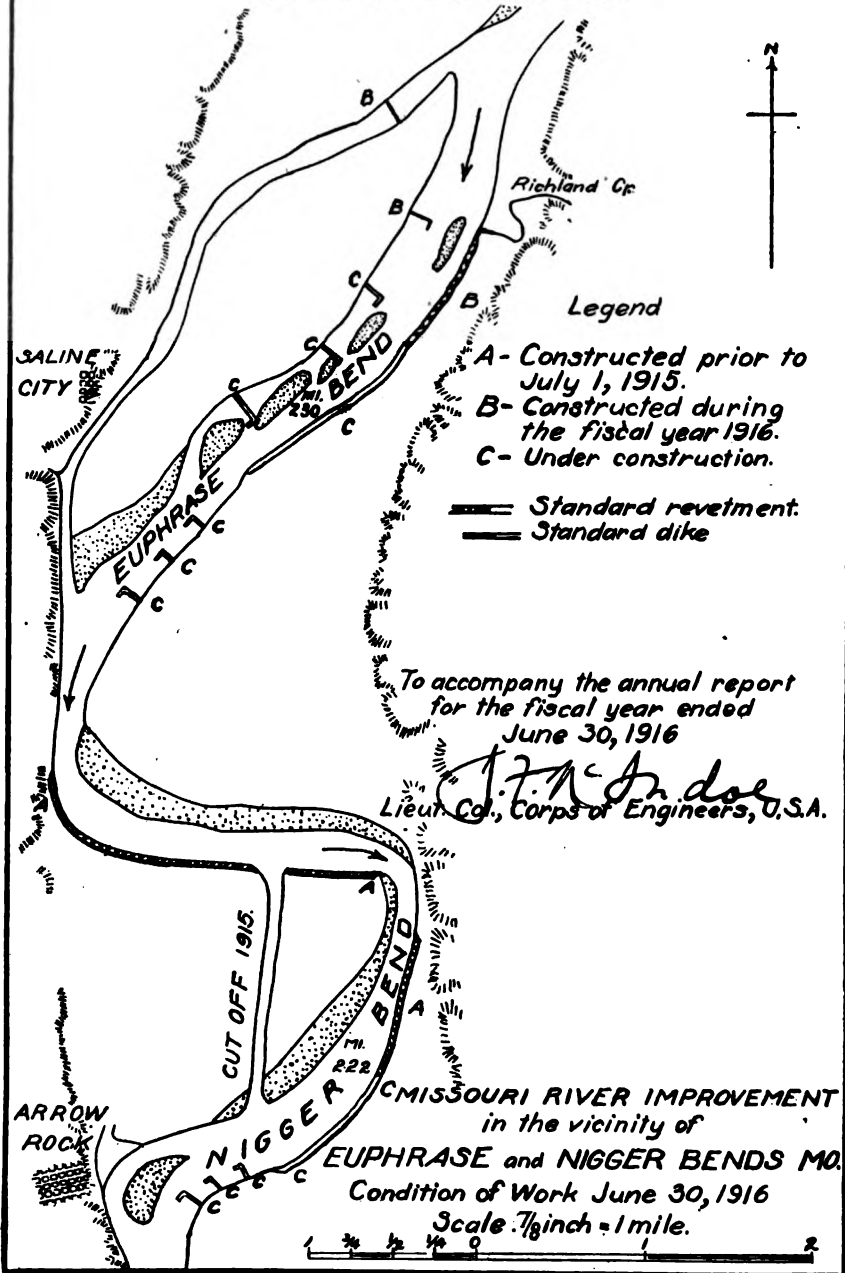
Legend

- A- Constructed prior to July 1, 1915.
- B- Constructed during the fiscal year 1916.
- C- Under construction.

- Standard revetment.
- Standard dike

To accompany the annual report
for the fiscal year ended
June 30, 1916

J. J. McAnis
Lieut. Col., Corps of Engineers, U.S.A.

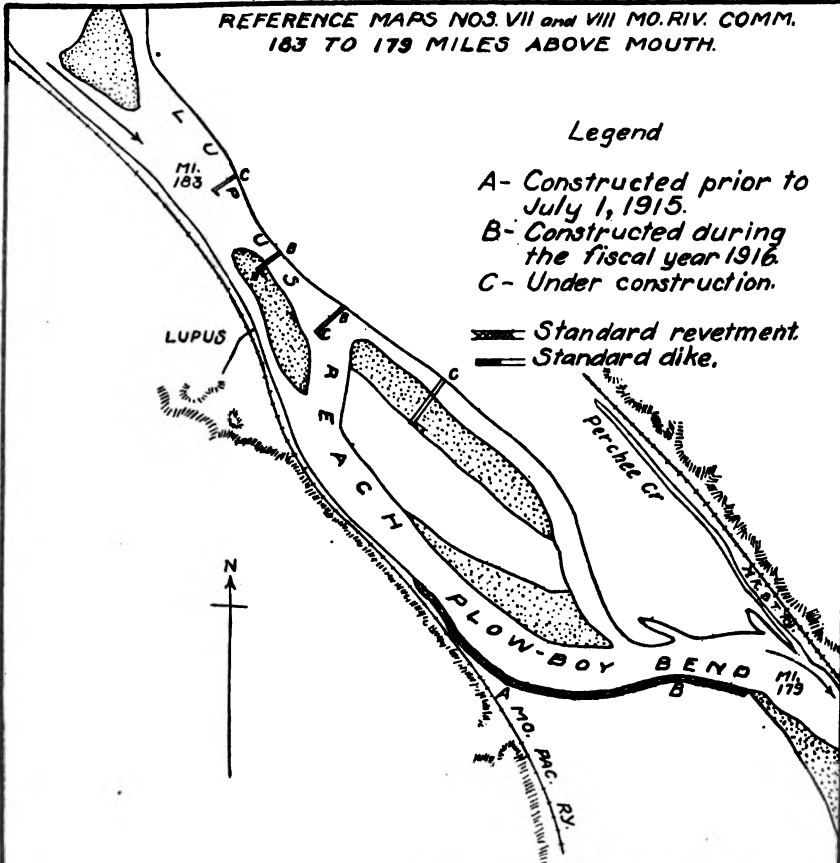


REFERENCE MAPS NOS. VII and VIII MO. RIV. COMM.
183 TO 179 MILES ABOVE MOUTH.

Legend

- A- Constructed prior to July 1, 1915.
- B- Constructed during the fiscal year 1916.
- C- Under construction.

Standard revetment.
Standard dike.

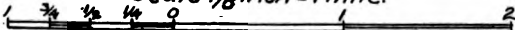


To accompany the annual report
for the fiscal year ended
June 30, 1916.

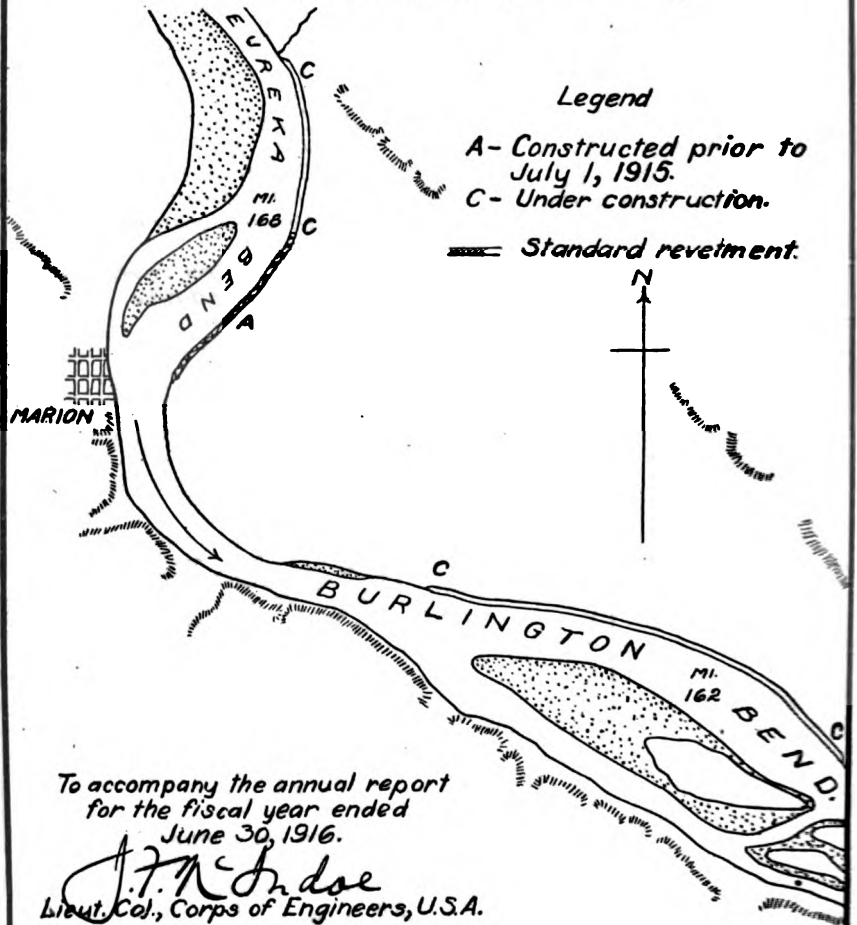
J. F. Anderson
Lieut. Col., Corps of Engineers, U.S.A.

MISSOURI RIVER IMPROVEMENT
in the vicinity of
LUPUS REACH AND PLOW BOY BEND, MO.
Condition of Work June 30, 1916.

Scale: $\frac{1}{8}$ inch = 1 mile.



REFERENCE MAP No. VII MO. RIV. COMM.
168 AND 162 MILES ABOVE MOUTH.



MISSOURI RIVER IMPROVEMENT
in the vicinity of
EUREKA and BURLINGTON BENDS MO.
Condition of Work June 30, 1916.

Scale: $\frac{7}{8}$ inch = 1 mile

dike destroyed during the floods of 1915. From the left or main bank 300 feet of dike is built of high structure, and 240 feet of like structure is built next the island bank, at an angle of 35° to bank line, with a connecting low section, 1,340 feet built normal to the channel. After completion the two end wings were silted their entire length and the chute generally showed indications of closing. During the February, 1916, ice break-up a "block" was formed in the main channel, forcing the water through the chute and dike in a narrow channel and causing a 220-foot breach in the low section near the end of the island wing. Many of the piles from this break lodged against a dike a few miles downstream and none were found but what were whole and sound, showing that the break had been caused by a scour and not by breaking of the piles.

Diana Bend (left bank, mile 199; see pl. 17¹).—Two thousand feet of 3-row standard dike by hired labor and Government plant. Work began October 28, 1915, and that done during the year consisted of 1,330 feet of dike driven in place, 1,370 feet of mattress, and 1,330 feet of bracing. This work was suspended March 31, 1916, on account of excessive depth and high water, with about 68 per cent completed, at a field cost of \$21,838.14 to date. The dike survived several heavy runs of ice. During the heaviest run the ice was forced over the top of dike at a time when the stage was 6 feet below the top of dike. This run forced a few bents out of line near the middle of the completed section, but did no further damage. The dike was built to rectify river width and has produced fill above and below practically its entire length. Recent soundings show a channel depth of 8 feet at standard low water where formerly the crossing had from $3\frac{1}{2}$ to 4 feet.

Lupus Reach (left bank, mile 183; see pl. 18¹).—A system of four 3-row standard dikes; in all, 4,050 feet by hired labor and Government plant. Work began April 20, 1916, and that done during the year consisted of 1,730 feet of dike driven in place, 2,064 feet of mattress, and 860 feet of bracing. Work is about 28 per cent completed. This system of dikes is built to rectify river width, close a chute, and to hold the channel along bluff contact.

Plow Boy Bend (right bank, mile 180; see pl. 18¹).—Thirteen thousand two hundred and fifty feet of standard revetment, at \$9.25 per linear foot; unfinished contract from last year, which was extended for a reasonable time. The work done during the fiscal year consisted of 6,000 feet of bank graded, 6,220 feet of mattress, and 6,320 feet of paving. The contract was completed February 28, 1916, at a field cost of \$123,369.43.

Eureka Bend (left bank, mile 168; see pl. 19¹).—Seven thousand five hundred feet of standard revetment by hired labor and Government plant. The plant is assembled, awaiting the subsidence of high water, and the force is occupied in quarrying stone. The stone quarried and stored amounts to 1,475 cubic yards.

Burlington Bend (left bank, mile 163; see pl. 19¹).—Thirteen thousand feet of standard revetment, at \$8.18 per linear foot. The contract is dated October 5, 1915, and is to be completed October 22, 1916, but on account of high water no work has been done.

Murrays Bend (right bank, mile 156; see pl. 20¹).—A system of two 3-row standard dikes; in all, 1,350 feet, at \$14.40 per linear foot for high section, \$13 per linear foot for low section, and \$800 each for

¹ Not printed.

root-fill and bank protection. The contract is dated March 30, 1916, and is to be completed February 25, 1917. Work began June 9, 1916, and that done during the year consisted of 150 feet of bank graded, 250 feet of dike driven in place, and 454 feet of mattress. Work is about 17 per cent completed. This system of dikes is built to rectify river width and to hold the channel along left-bank bluff contact and the revetted bend below.

Chamois Bend (left bank, mile 125; see pl. 21¹).—A system of three 3-row standard dikes; in all, 3,000 feet, at \$14.40 per linear foot for high section, \$13 per linear foot for low section, and \$800 each for root fill and bank protection. The contract is dated March 30, 1916, and is to be completed February 25, 1917. The assembling of material is in progress. This system of dikes is to be built to rectify river width and to hold the channel along the revetment on right bank.

McGirks Island and Chute (left bank, mile 106; see pl. 22¹).—A system of four 3-row standard dikes; in all, 4,080 feet unfinished work from last year by hired labor and Government plant. One dike (2,300 linear feet) is for closing a chute and was completed August 5, 1914. The other three are for river rectification and to maintain a channel at Hermann, Mo.; the upper dike (350 linear feet) was completed June 3, 1914; the second dike (430 linear feet) was completed August 21, 1914; the third (proposed length 1,000 feet) was begun December 11, 1915, and the work done during the year consisted of 630 feet of dike driven in place, 570 feet of mattress, and 500 feet of bracing. Work was suspended January 11, 1916, on account of winter conditions with the total work about 89 per cent completed, at a field cost of \$38,334.74 to date.

Bates Island Bend (left bank, mile 100; see pl. 23¹).—Seven hundred feet of three-row standard dike, at \$12.11 per linear foot, by hired labor and Government plant. Work began April 5, 1916, and was completed April 26, 1916, at a field cost of \$8,476.27. This dike was built to rectify river width and to hold the channel along the revetment on right bank.

Bernheimer Reach (right bank, mile 91; see pl. 24¹).—A system of two 3-row standard dikes, in all 3,900 feet, by hired labor and Government plant. Work began May 19, 1916, and is being carried on by two working forces, and that done during the year consisted of 2,430 feet of dike driven in place, 2,177 feet of mattress, and 1,000 feet of bracing. Work is about 48 per cent completed. This system of dikes is built to rectify river width and to hold the channel along the revetment on left bank.

Dewey Bend (right bank, mile 76; see pl. 25¹).—Seven thousand one hundred and twenty-five feet of combined willow mattress revetment and concrete paving, at a field cost of \$8.13 per linear foot; unfinished work from last year by hired labor and Government plant. The work done during the year consisted of 3,636 feet of bank graded, 3,770 feet of mattress, and 4,159 feet of paving. The work was completed December 17, 1915, at a field cost of \$57,919.78.

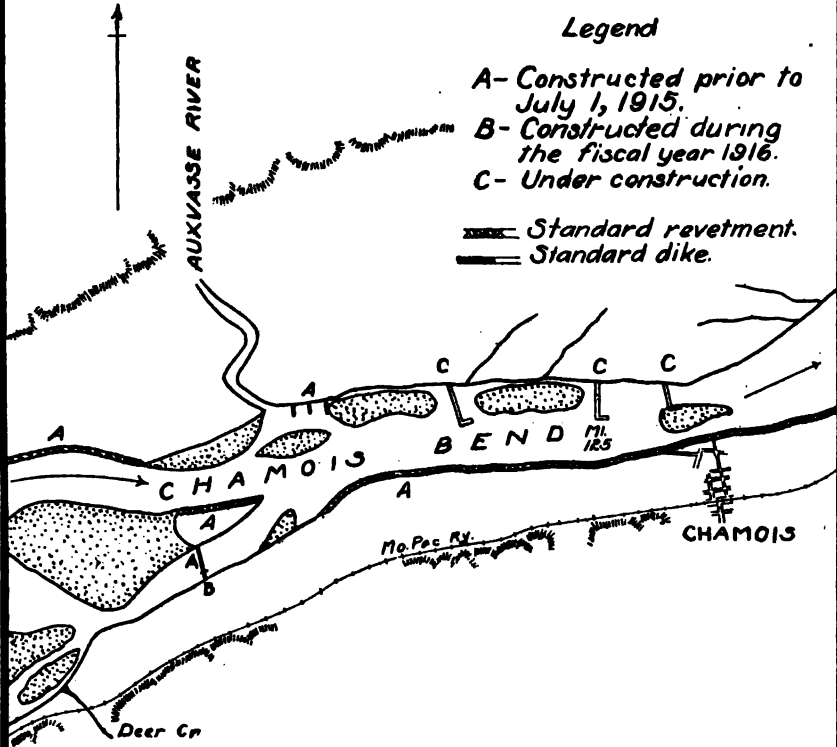
Hinkles Bend (right bank, mile 63; see pl. 26¹).—Seventeen thousand feet of combined willow mattress revetment and concrete paving by hired labor and Government plant. Work began March 20, 1916, but was soon suspended on account of high water. That done

REFERENCE MAP NO. VI. MO. RIV. COMM.
12.5 MILES ABOVE MOUTH.

Legend

- A- Constructed prior to July 1, 1915.
- B- Constructed during the fiscal year 1916.
- C- Under construction.

 Standard revetment.
 Standard dike.



To accompany the annual report
for the fiscal year ended
June 30, 1916.

J. F. Anderson
Lieut. Col., Corps of Engineers, U.S.A.

MISSOURI RIVER IMPROVEMENT
in the vicinity of

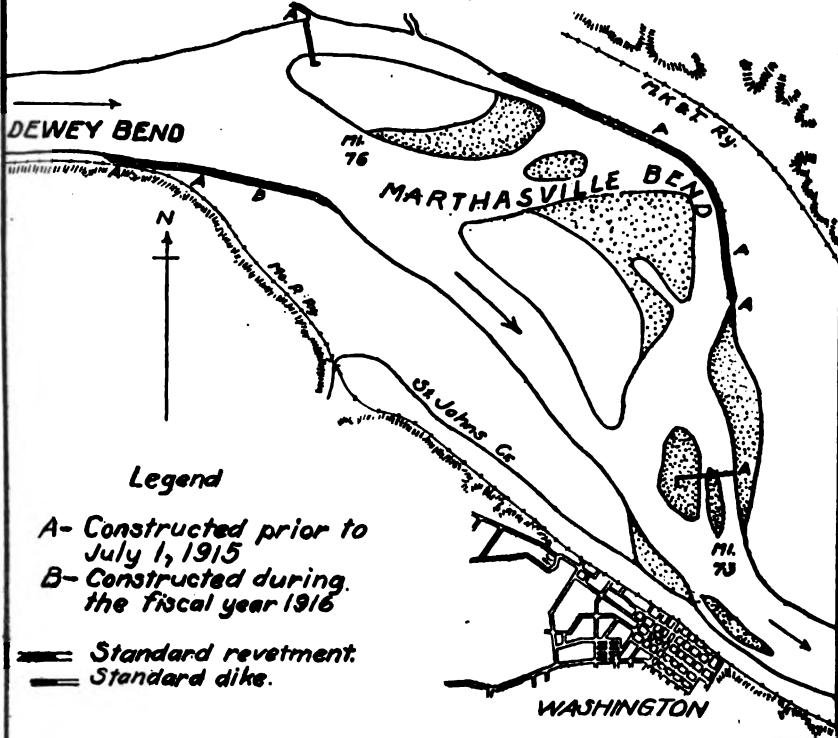
CHAMOIS BEND, MO.

Condition of Work June 30, 1916.

Scale $\frac{7}{8}$ inch = 1 mile.



REFERENCE MAP NO. IV. MO. RIV. COMM.
76 MILES ABOVE MOUTH



Legend

- A- Constructed prior to July 1, 1915
- B- Constructed during the fiscal year 1916

- Standard revetment.
- Standard dike.

To accompany the annual report
for the fiscal year ended
June 30, 1916.

J. F. McIndoe
Lieut. Col., Corps of Engineers, U.S.A.

MISSOURI RIVER IMPROVEMENT
in the vicinity of

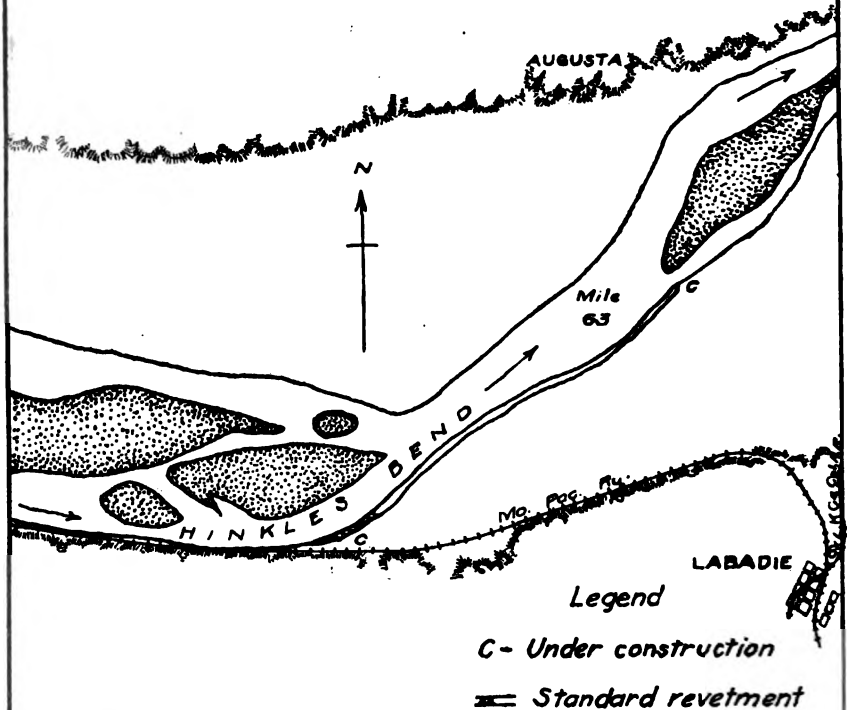
DEWEY BEND MO.

Condition of Work June 30, 1916

Scale: $\frac{1}{8}$ inch = 1 mile



REFERENCE MAP NO. III MO. RIV. COMM.
63 MILES ABOVE MOUTH

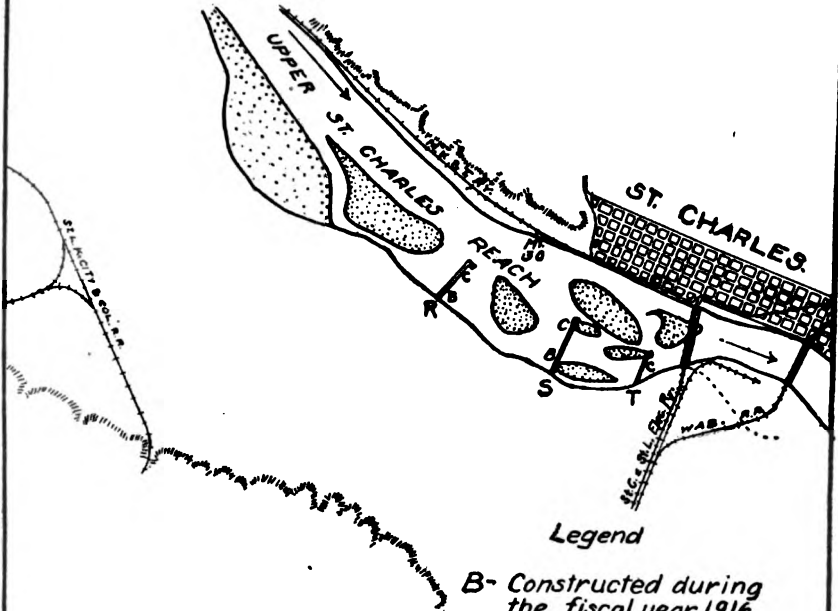


To accompany the annual report
for the fiscal year ended
June 30, 1916

J. F. Anderson
Lieut. Col., Corps of Engineers, U.S.A.

MISSOURI RIVER IMPROVEMENT
in the vicinity of
HINKLES BEND, MO.
Condition of Work June 30, 1916
Scale: $\frac{7}{8}$ inch = 1 mile.

REFERENCE MAP NO. II MO. RIV. COMM.
30 MILES ABOVE MOUTH.



Legend

B- Constructed during
the fiscal year 1916.
C- Under construction.



Standard dike.

To accompany the annual report
for the fiscal year ended
June 30, 1916

J. N. Doe
Lieut. Col., Corps of Engineers, U.S.A.

MISSOURI RIVER IMPROVEMENT
in the vicinity of
UPPER ST. CHARLES REACH, MO.
Condition of Work June 30, 1916.
Scale $\frac{1}{8}$ inch = 1 mile.



during the year consisted of 900 feet of bank graded and 287 feet of mattress. On account of high water it will be necessary to regrade the bank. During the year 2,825 cubic yards of stone were quarried and stored.

*Upper St. Charles Reach (right bank, mile 30; see pl. 87¹).—*A system of three 3-row standard dikes, in all 4,100 feet, by hired labor and Government plant. Work began April 5, 1916, and that done during the year consisted of 2,290 feet of dike driven in place, 2,930 feet of mattress and 1,450 feet of bracing. The work is about 58 per cent completed. This system of dikes is built to rectify river width and to hold the channel along left-bank bluff contact and to maintain a river front at St. Charles.

*Maintenance and repair of works by hired labor and Government plant.—*At the time of the subsidence of the early rises to include the June rise, the improvement work had suffered little material damage. The later and continued floods produced damages by cross channels over the bars, which permitted direct attack on the revetment in the bends below, and land channels behind the dikes. It is estimated that the damages sustained during the year amounted to 2 per cent. As the stages which continued prevented effective original work, four of the working forces were detailed on repairs, and before the opening of the working season in March, 1916, a larger part of the repairs had been completed.

*Waverly Bend (right bank, mile 297).—*Eroded bank line was faired out by a 2-row dike, 1,050 linear feet; bank regraded and paved 2,595 linear feet, for which a new mattress was woven 1,320 linear feet; old paving repaired 710 linear feet; the total revetment repaired was 4,305 linear feet, at a field cost of \$36,098.88.

*Glasgow Bend (right bank, mile 238).—*The three dikes constructed in cooperation with the Chicago & Alton Railway Co. were rescreened where necessary and the roots filled to required height. The work was completed July 1, 1915, at a field cost of \$603.52.

*Bluffport Reach (right bank, mile 236).—*The two dikes of this system were breached during the June rise and were repaired as follows: Dike No. 1, 760 linear feet; Dike No. 2, 840 linear feet. Work completed November 22, 1915. During the ice breakup in February, 1916, Dike No. 2 was again breached and repaired by replacing 360 linear feet. The total repairs to this system was 1,960 linear feet at a field cost of \$24,068.27.

*Euphrase Bend (Right bank, mile 230).—*Dike in chute was breached by heavy run of drift and was repaired by replacing 80 linear feet of dike; upper dike was broken up by heavy run of ice and repairs were made by replacing 220 linear feet of dike. The total repairs to this system was 300 linear feet, at a field cost of \$5,632.79.

*Saline City Bend (right bank, mile 226).—*Eroded bank line was faired out by a 1-row dike with a new mattress and intermediate brush fills, for a length of 1,410 linear feet; old revetment repaired, 600 linear feet. The total revetment repaired was 2,010 linear feet, at a field cost of \$8,134.48.

*Saline City Bend (right bank, mile 226).—*A chute almost amounting to a cut-off was formed across the revetment and this bend (see pl. 16), to close which the necessary material for a dike was assem-

¹ Not printed.

bled in December, 1915. A force was organized and began work January 3, 1916, and by January 21 had completed 460 feet of mattress, the chute being practically dry. The ice breakup and rise of January 22, 1916, washed out the mattress, and on account of high water and winter conditions the work was suspended. The field cost of preparation and of the work done amounted to \$4,151.03.

Franklin Bend Chute (left bank, mile 204).—The dike in this chute was breached by heavy run of ice. A force was organized and an attempt to close the gap was made in April, 1916, but owing to high water the work was discontinued. The cost of the work done amounted to \$1,186.68.

Providence Bend (left bank, mile 176).—A surface drain washout was filled with brush and stone for a length of 250 linear feet, and two small breaks of 150 linear feet each at toe of slope were repaired. The total revetment repaired was 550 linear feet at a field cost of \$942.73.

Sandy Hook Bend (right bank, mile 172).—Two small breaks of 100 linear feet each, at toe of slope were repaired at a field cost of \$425.56.

Eureka Bend (left bank, mile 167).—Piles were driven 10-foot centers along toe of slope for a distance of 680 linear feet and the slope was faired out with brush and stone fill at a field cost of \$1,407.90.

St. Aubert Bend (left bank, mile 129).—Standard revetment was replaced 225 linear feet, and exposed mattress was repaved 132 linear feet. The total revetment repaired was 357 linear feet at a field cost of \$927.37.

St. Aubert Bend Chute (right bank, mile 129).—A break of 300 feet had been made in Dike No. 1, for repair of which a force began work March 4, 1916, and piles were driven across the gap with the mattress about three-fourths completed when a rise occurred which took out most of the repair work. A second attempt was made April 17, 1916, at closing the gap, with like results, and at the close of the year practically all the repair work has been destroyed. The work done during the year consisted of 500 feet of dike driven in place. 596 feet of mattress, and 410 feet of bracing, at a field cost of \$8,294.46. During the enforced lay up after May 20, 1916, on account of high water, the force quarried and stored 2,000 cubic yards of stone at Rising Creek at a cost of \$1,860.26.

Chamois Bend (right bank, mile 125).—A 50-foot break at water edge of the revetment was repaired by brush and stone fill at a field cost of \$224.48.

Heckmanns Island (left bank, mile 110).—Dike No. 1 was flanked by a bank channel being formed behind the dike. A three-row dike 1,170 linear feet was built from the main high bank to join up with the old dike at a field cost of \$13,149.61.

McGirks Island Chute (left bank, mile 106).—The dike for closing this chute was flanked on the island end by a bank channel. A three-row dike, 460 linear feet, was completed May 23, 1916, from the new island bank to old dike, with 805 feet of standard revetment as bank protection on the downstream side and 130 linear feet of abattis across low ground at root, all at a field cost of \$6,525.33. A section of about 300 feet was breached in the new work May 29, 1916, and the protection revetment below the dike was practically destroyed.

Bates Island Chute (left bank, mile 99).—The five-row dike for closing chute at this location was flanked at both ends during the

flood periods of 1915. The gap on the island, or south end, was closed by an oblique five-row dike 450 feet with 140 feet of standard revetment as bank protection on the downstream side, the gap on the main bank, or north end, was closed by a five-row dike 370 feet, normal to the channel, with 140 feet of standard revetment as bank protection on the downstream side. The total dike repaired was 820 linear feet at a field cost of \$14,474.90. During the ice breakup of February, 1916, about 150 feet of north end of new dike was destroyed, but during the present season's floods the remainder of the dike has been well silted.

Bates Island Bend (right bank, mile 98).—The revetment at this location is of the combined willow mattress and concrete paving type completed in 1913. This revetment was badly damaged at intervals for a distance of about 6,000 feet from the lower end; so far, a satisfactory reason for this damage has not been determined, as much of the paving bank with mattress and concrete blocks is intact at toe of slope, the breaks being mostly in the paving 8 feet above the low-water line, where the slabs, with reinforcing strand and wire, are broken in every conceivable manner and shape, the strand and wire being sheared off as though with a knife. At low water about 1,000 feet of this revetment from the lower end shows up with the bottom row of 8-foot paving slab intact, with a pocket of water 6 to 8 feet deep behind the line. The breaks in this revetment, except the 1,000 feet at lower end, were repaired with brush and stone fills to fair out the slope line, in all 2,956 linear feet, at a field cost of \$12,251.24.

Pinkney Bend (left bank, mile 89).—A 100-foot break at water edge of the revetment was repaired by brush and stone fill at a field cost of \$419.66.

Marthasville Chute (left bank, mile 75).—A bank of 120 feet near the middle and the island end was flanked by bank channel during the flood stages of 1915. The break and gap were closed with 420 linear feet of three-row dike, at a field cost of \$6,450.56.

Marthasville Bend (left bank, mile 74).—Two small breaks, one of 100 feet near head and the other of 50 feet near foot of the combined willow mattress and concrete paving, were repaired by brush and stone fills to fair out the slope line, at a field cost of \$590.62.

Marthasville Bend (left bank, mile 73).—The system of two three-row dikes was breached during the flood stages of 1915. No. 1 had been joined to main bank by a one-row, 220-foot section across high bar; this section was destroyed and the bar washed out; a breach was also made in low section near outer end. No. 2 was breached near the middle by heavy run of drift. These breaks were repaired by the construction of three-row standard dike; No. 1, two breaks, 590 feet, and No. 2, one break, 790 feet; in all, 1,380 linear feet, at a field cost of \$32,284.53. The loss of partly completed work by sudden rises and the replacing same is the cause of the excessive cost of this work.

Pelican Bend (car of Commerce Point, concrete dike).—At the beginning of the year the force was assembled, awaiting the subsidence of high water. As repairs, three sections, 430, 320, and 380 feet, respectively, of five-row dike was built to close the gaps; in all, 1,130 linear feet, at a field cost of \$23,247.88.

Systematic improvement.

Locality (bonds).	Miles above mouth.	Extent of work.		Contract or hired labor.	Amount completed—			Date of completion.	Unit price per foot.
		Character.	Amount.		June 30, 1915.	During fiscal year 1916.	Total.		
Various localities			<i>Fed.</i>				212,251	Prior to June 30, 1915.	\$27.21
Mouth Kansas River		Revetment.	212,251				28,865		9.55
Randolph.		Dike.	28,865				1,705		14.26
Siasons.	392	Abatis.	1,705				1,080	Dec. 3, 1915.	9.00
Blue Mills.	379	Dike.	1,080	Contract.	150	880			13.48
Jacksons.	371	Revetment.	5,400	do.					10.09
Napoleon.	367	do.	1,000	do.					12.48
Do.	341	do.	3,200	do.					10.09
Upper Camden.	340	Revetment.	9,000	do.					13.70
Camden.	338	Dike.	2,850	do.	14,675	2,365	17,040	Oct. 29, 1915.	10.15
Waverly, Mo.	333	Dike.	17,040	do.					8.56
Bakers.	299	Revetment.	3,050	do.	6,280				12.85
Do.	295	Dike.	6,280	Hired labor.					15.28
Do.	293	Revetment.	3,500	Contract.	2,840	2,840	6,280	July 3, 1915.	15.00
Do.	286	do.	2,960	do.					8.34
Do.	283	Revetment.	10,000	do.	4,000	3,225	7,225	Nov. 30, 1915.	12.96
Do.	280	Dike.	5,000	do.					10.00
Bluffport.	236	do.	1,000	do.					15.00
Euphrase.	230	do.	2,030	Hired labor.	2,030	1,470	3,500	June 1, 1915.	12.96
Do.	229	Revetment.	4,300	do.					10.00
Do.	228	Dike.	12,000	Contract.		6,005	6,005		20.10
Nigger.	222	Revetment.	2,250	do.					15.00
Do.	221	Dike.	6,500	Hired labor.					15.00
Do.	204	do.	2,200	do.					15.00
Franklin (chute).	199	do.	1,890	do.	1,220	660	1,880	Oct. 27, 1915.	15.00
Diana.	189	do.	2,000	do.					15.00
Lopus.	183	do.	4,050	do.					15.00
Flow Boy.	180	Revetment.	13,250	do.	6,930	1,330	1,530	Feb. 23, 1916.	9.25
Eureka.	168	do.	7,500	Contract.					10.00
Burlington.	163	do.	15,000	Hired labor.					8.18
Murrays.	166	Dike.	550	Contract.					14.40
Chamola.	126	do.	800	do.		360	360		13.00
McGills Island.	106	do.	1,700	do.		50	50		14.40
Bates Island.	100	do.	4,080	Hired labor.	3,080	600	3,680		12.11
Bernheimer.	91	do.	700	do.		700	700	Apr. 25, 1916.	15.00
Dewey.	76	do.	3,000	do.		2,000	2,000		8.18
Marthaeville.	76	Revetment.	7,125	do.	2,996	4,129	7,125	Dec. 17, 1915.	15.00
		Dike.	2,500	do.					

Emile.....	63	Revestment..	17,000	do.....	2,200	2,200	110.00
Upper St. Charles.....	20	Dike.....	4,100	do.....	2,200	2,200	115.00
Mullanphy.....	20	do.....	3,600	do.....			115.00
Total.....		(Revestment..	341,346		21,044	203,176	
		Dike.....	89,085		17,400	63,745	
		Abatis.....	1,705			1,705	

1 Estimated.

Statement of work of maintenance and repairs.

Locality (bends).	Miles above mouth.	Extent of work.		Date of completion.
		Character.	Amount.	
Various localities.....		Revetment.....	Feet. 12,606	} Prior to June 30, 1915.
Waverly.....	297	Dike.....	8,240	
Glasgow.....	238	Revetment.....	4,305	Apr. 20, 1915.
Bluffport Reach.....	236	Dike, root nil.....		July 1, 1915.
Euphrase.....	230	Dike.....	1,960	May 4, 1915.
Saline City.....	226	do.....	300	May 13, 1915.
Providence.....	176	Revetment.....	2,010	Nov. 4, 1915.
		Revetment, slope fill and paving.....	560	Nov. 15, 1915.
Sandy Hook.....	172	do.....	200	Nov. 16, 1915.
Eureka.....	167	Revetment, bank repaved.....	680	Nov. 20, 1915.
St. Aubert.....	127	do.....	357	Dec. 24, 1915.
Chamois.....	126	Revetment, slope fill.....	50	Dec. 18, 1915.
Heckmanns Island.....	111	Dike.....	1,170	Mar. 28, 1916.
McGirks Island (chute).....	106	do.....	460	May 23, 1916.
Bates Island (chute).....	99	do.....	820	Dec. 17, 1915.
Bates Island.....	98	Revetment, fills and repaved.....	2,956	Mar. 28, 1916.
Pinckney.....	89	Revetment.....	100	May 25, 1916.
Marthasville (chute).....	75	Dike.....	420	Sept. 3, 1915.
Marthasville.....	74	Revetment fills.....	150	Dec. 14, 1915.
Do.....	73	Dike.....	1,390	Do.
Pelican.....	16	do.....	1,130	Oct. 28, 1915.

PLANT AND BOAT YARD.

New plant and repairs by hired labor.—The construction of new plant and repairs to old plant was under the local charge of Asst. Engineer Harry Hodgman.

Towboat "Edward M. Baldwin."—Authority was granted for the construction of a steel-hull towboat, 24 feet by 116 feet by 5 feet. Work on the boat began November 15, 1915, in the shaping of plates, and assembling began March 13, 1916. The parts which have been completed and riveted in place are as follows: Stern, frames (1 to 77), longitudinal trusses (1 center and 2 wing), transverse bulkheads (at frames 10, 19, 30, 47, and 63), transoms (at frames 76 and 77), deck beams (1 to 77), 2 engine trusses, all bottom and side plates, and 12 knuckle plates on each side. The hull is about 80 per cent completed and all material has been received.

Motor launch "Tomahawk."—Dimensions, 5 feet 2 inches by 22 feet 6 inches by 2 feet 4 inches. The hull was completed at the beginning of the year and the engine was installed by September 7, 1915, at a total cost of \$572.87. In addition to the above launch, authority was granted for the construction of two motor launches, *Whetstone*, 5 feet by 24 feet by 1 foot 10 inches; and *Bonhomme*, 4 feet 11 inches by 21 feet 7 inches by 2 feet 6 inches. The *Whetstone* was completed March 28, 1916, at a cost of \$378.08. The *Bonhomme* was completed March 9, 1916, at a cost of \$418.14.

Pontoons.—Three pontoons 7 by 22 by 3 feet were completed March 14, 1916, at a cost of \$241.31.

Skiffs.—As needed during the year two skiffs 20 feet long were constructed at a cost of \$91.17.

REPAIRS TO PLANT.

Snag boat "Missouri."—The machinery was overhauled, repaired, and relined; the circulating and fire pumps were repaired; all valves on high-pressure engines were reground; a new stringer placed under

boiler deck; forward plank sheer on each side replaced; a hole in forward deck was patched; new base placed under shear legs and one capstan; the boilers were scaled and Snowden heater repaired; the furnace to main battery of boilers was repaired and new fire brick installed; the electric light engine was overhauled and repaired; the wheels were overhauled and repaired; necessary repairs were made to roof and cabins and the outside of hull and cabin painted, at a cost of \$4,413.06.

Towboat "Augustin."—A puncture in side near bow was repaired by replacing two side frames and a new plate; the nosing across bow and for 36 feet aft on each side were replaced; two new pitmans and new cam on aft side were made and installed; six new stationary fenders replaced on the side bulkheads of engine room repaired; and two new stack knees and six fenders were made and installed, at a cost of \$696.07.

Towboat "Gurney."—The machinery and wheel were overhauled and repaired; condenser was repaired and one new siphon installed; the boilers and furnace were overhauled and repaired; all valves and pump seats were reground; and the steering gear was overhauled and repaired, at a cost of \$867.93.

Towboat "Lewis."—The machinery and wheel were overhauled and repaired; a new steel rudder was made and installed; pumps, condenser, and piping were repaired; new cam brackets were made and installed; and general minor repairs made to roof and cabin, at a cost of \$1,363.38.

Towboat "Daniel Boone."—The machinery, main steam piping, and wheel were overhauled and repaired. A new wooden rudder and new bumpers were made and installed. New flues were placed in the boiler, new breeching, ash pan and water back band were made and installed; capstan engines and heaters were repaired; a new set of towing bitts were made and installed and repairs were made to chocks and kevels; a new canvas cover was put on the splash bulkhead; and general minor repairs made to roof and cabin, at a cost of \$564.77.

Survey boat "Katherine."—The sides above water line were re-calked and deck repaired, at a cost of \$28.04.

Motor launches.—The engine of the *Hurricane*, an old one from a condemned launch, was overhauled and repaired and broken parts replaced by new ones and two new bottom planks replaced, at a cost of \$314.68. In other launches the engines were overhauled and hulls painted as follows: *Wildhorse*, \$61.25; *Moniteau*, \$22.57; *Bonhomme*, \$30.42.

Grader "IV E. P."—The machinery was overhauled and repaired. The capstan engine was repaired and new brasses installed; boiler feed and grader pumps were repaired; and valves were reground, at a cost of \$187.87.

Pile drivers Nos. "4," "5," and "7 Y."—The machinery was overhauled and general minor repairs were made, at a cost of \$211.22.

"No. 3."—The boiler was changed, new fire box placed, and general minor repairs made to deck and cabin, at a cost of \$301.89.

No. 15 was pulled out on the ways and decayed hull timbers replaced with creosoted material, which included the gunwales, head blocks and lower streaks of bulkheads. The machinery was overhauled and repaired, new sills for leads and outrigger chocks were

made and installed, and general minor repairs were made to cabin, at a cost of \$2,133.70.

Land pile driver.—New sills were made and installed, the leads and hammer sheaves were repaired, hoisting machinery was overhauled and repaired, and new winch head and kevels installed, at a cost of \$429.07.

Quarter boats Nos. "1," "2," "3," and "4."—The ranges, decks, sides of 2 and 3 recalced above water line and minor repairs were made to cabins, at a cost of \$362.78. *No. 501* was transferred from the upper river, and in passing the Omaha bridge was jammed against the pier and the side crushed. She was pulled out on the ways and the hull and cabin straightened. The cabin was repaired by replacing outriggers and 40 linear feet of flooring, nosing, and rail on berth deck and roof; new canvas was placed on the roof and berth deck, and general minor repairs made to cabin. The hull was repaired by placing outriggers and 40 linear feet of gunwale, nosing, top and bottom plank shear, and guard walk; the deck, fore and aft, was repaired and capstan replaced; four decayed bottom planks were replaced and the hull recalced complete. She was launched June 22, 1916, ready for commission, at a cost of \$604.56.

Mattress barges Nos. "3" and "5."—General minor repairs were made to decks and *No. 5* was recalced above water line, at a cost of \$17.12. *No. 3* was pulled out on the ways and new deck beams, deck, and two top gunwales replaced; decayed parts of longitudinal bulkheads were replaced, and the bottom, sides, and deck were calked complete. The barge was launched April 5, 1916, ready for commission, at a cost of \$1,469.51.

Temporary dredges.—Installed on barges *III-S* and *156*. The machinery and pumps were overhauled and minor repairs were made, at a cost of \$412.46.

Material barges.—Wooden-hull barges *147, 153, 155, 163, 165, 166, 167, and 169* were calked above water line and insides cleaned, at a cost of \$135.33. *No. 162* had been snagged; it was pulled out on the ways and 30 bottom planks and keelson timbers and deck streak were replaced, and the bottom, sides, and deck recalced, at a cost of \$313.87. Steel-hull barges *303, 305, 306, 310, 312, 314, 322, 324, 326, and 328*, the decks were cleaned by sand blast and painted, and broken timber heads and kevels were replaced, at a cost of \$2,289.39. *Nos. 323 and 327*, kevels were repaired, at a cost of \$15.82.

Pontoons.—Thirteen were repaired and recalced, at a cost of \$159.34.

Skiffs.—Twenty-five were repaired and recalced, at a cost of \$201.94.

Ways.—The ship ways were repaired by the construction of 11 new way logs and 11 new needles or tilting logs, all of yellow-pine material. The log ways were made of 10 by 12 inch timbers built to 156 feet length (with an incline of 1 on 6) to 4 feet below low water, supported at 6-foot intervals by piles driven 15 to 20 feet penetration. Each needle is made of built-up timbers, one (top) piece 12 by 12 inches by 34 feet; one piece 12 by 12 inches by 28 feet; one piece 6 by 16 inches by 21 feet; and one piece 4 by 16 inches by 4 feet, all bolted and keyed together with centers coincident and axes parallel. Each needle is supported by a trunnion log 12 by 12 inches by

6 feet with rounded top, the needle having a groove 6 inches deep on the underside to seat same. The trunnion log is supported at each end by 10 by 10 inch by 3 foot timbers, each of which in turn is supported by two piles. The work was completed February 12, 1916, at a cost of \$5,178.08.

Punching-machine house.—A house 24 feet 5 inches by 26 by 12 feet was built over the punching machine. Completed October 13, 1915, at a cost of \$263.43.

Miscellaneous plant and tools.—General minor repairs were made to yard machinery, tools, buildings, and property at a cost of \$6,108.64.

SNAGGING.

Snag boat "Missouri."—Capt. Jno. S. Campbell, master. At the beginning of the fiscal year the boat was tied up at Boonville, Mo., awaiting the subsidence of high water, from which place she cleared August 18 for upstream snagging operations, arriving at Kansas City September 24. On her down trip she was used by the district officer and assistant for inspection services to Glasgow, Mo., arriving September 28. The boat made an upstream trip from Glasgow and arrived at Kansas City October 11, where she was prepared for an inspection trip. On her down trip, leaving Kansas City October 15, she was used by five members of the Board of Engineers for Rivers and Harbors, the division engineer, district officer, and assistants for an inspection trip. Upon arrival at Boonville October 16 the senior member of the board joined the party, and the inspection was continued to Washington, Mo., arriving October 18, where the inspection trip was ended and the boat continued to the mouth of the river. On her next up trip she arrived at Waverly, Mo., December 10, and was returned to Gasconade boat yard, arriving December 13, and was laid up for the winter and minor repairs made to machinery. She was put in commission March 1, 1916, and arrived at Kansas City April 8. After taking on fuel and supplies she cleared for down trip April 11, and was used by the lighthouse inspector and district officer and assistants for inspection services, arriving at St. Louis April 14. On her next up trip she arrived at Kansas City June 15, and returned to mouth of river for upstream operations, and at the end of the year had arrived at head of Pinckney Bend (mile 93).

In addition to snagging operations, the duty of attending aids to navigation has been assigned the *Missouri*, and during the year she visited and cared for a total of 354 aids at a cost of \$2,810.47, to be reimbursed by the Lighthouse Service.

The work accomplished was as follows: 1,524 snags, 70 drift heaps, and 3 wrecks removed from channel; 2,166 trees felled and 26 shore snags cut from caving banks; 176 piles removed from old dikes which formed obstructions to revetment work; 1,412 miles of river worked over, and 3,007 miles run.

Expenses.

Labor and services	\$20, 876. 18
Travel of employees	110. 15
Subsistence stores	5, 593. 20
Repairs and boat supplies	2, 210. 27

Fuel -----	\$4, 626. 17
Equipment -----	781. 59
	34, 197. 56
Less lighthouse expenses -----	2, 810. 47
Total -----	31, 387. 09

SURVEYS.

On account of continued high water no detailed surveys were made, as satisfactory results could not be obtained for study of conditions over improved sections. To determine the change in river slope above and below the cut-off at Napoleon Bend (mile 340) gauges have been established as follows: Liberty Landing (mile 374), head Jacksons Bend (mile 368), Missouri City Bend (mile 367), Hulls Point (mile 355), Sibley (mile 350), Fishing River (mile 348), Fishing River Bend (mile 344), Napoleon (mile 342), Napoleon Bend (mile 341 and 340); a like number of gauges are to be established below the cut-off.

WORK IN COOPERATION WITH LOCAL INTERESTS.

Mouth Kansas River (right bank, mile 392; see pl. 8).—One thousand and thirty feet of longitudinal three-row dike with fascine crib fill, constructed in cooperation with the Kaw Valley drainage board, at prices to the United States \$9.70 per linear foot for dike, \$11.05 per linear foot for mattress, \$4.25 per cord of willow brush for fascines, \$2.40 per cubic yard for stone ballast, and \$0.45 per linear foot for extra length of piles over 45 feet; unfinished contract from last year in which the time limit was waived on account of high water. The work done during the year consisted of 770 feet of dike driven in place, 755 feet of mattress, and 1,030 feet of bracing and fascine crib fill. The contract was completed December 3, 1915, at a cost of \$28,022.15, of which the United States paid \$10,000. This dike was built to fair out the bank line to coincide with the established harbor line and to provide a base for the levee. The fill and levee has been made by earth waste dredged from the Kansas River and the toe of slope reinforced by a deposit of "derrick stone."

East Botton Bend (right bank, mile 338).—September 18, 1911, the Chief of Engineers approved a recommendation for cooperation with Kansas City, Mo., in the construction of 9,900 linear feet of longitudinal 3-row dike along the established harbor line, and 5,300 linear feet of 2-row cross dike in which the United States was to expend \$105,000. The plans and specifications were approved by the Secretary of War July 20, 1912, and the city authorities notified August 3, 1912, since which date this work has been held in abeyance pending city action. This matter has been called to the city's attention periodically since its approval, and when requested on May 29, 1916, for an expression as to whether the city had reached a decision as to its course of action, the mayor, in a letter dated June 14, 1916, states: "The city has abandoned the original plan * * * and we do not feel like standing any part of the expense of putting in the dike on the harbor line." As navigation would not be benefited as much as the local interests, a modification of the subproject will be submitted.

IMPROVEMENTS OTHER THAN GOVERNMENT WORK.

The Wabash Railroad Co. has been menaced continually during the year, and their work has been mostly confined to maintenance in the protection of its tracks along the left bank of the river in Irish Jimmies Bend, mile 365; Missouri City Bend, mile 362; Hulls Point, mile 355; and De Witt Bend, mile 266. The expenditures amounted to \$100,000.

For protection of its tracks along the left bank in Thomas Bend, mile 275, the Wabash Railroad Co. constructed 2,200 linear feet of standard revetment at a cost of \$30,000, and 1,500 linear feet of revetment, being a combination of brush and stone filled woven-wire mattress, and a 2-inch layer of concrete over stone-paved bank, at a cost of \$20,000; the latter work has been damaged for a length of about 100 feet at water line.

The Missouri Pacific Railway is along the foot of bluffs on the right bank of the river and the track has been menaced during the year by bank slides, for maintenance and protection of which the company has constructed work as follows:

Napoleon, Mo. (mile 342).—One thousand two hundred linear feet of standard revetment, estimated cost \$12,000.

Mouth of Sni River (mile 328).—Temporary emergency work, 3,706 linear feet of brush and stone-filled woven-wire mattress, at an estimated cost of \$27,500. This mattress was woven in place on the bank, which later eroded so that the mattress sunk into the water and formed a protection.

Myrick, Mo. (mile 325).—Temporary repairs to existing work, 3,156 linear feet of fascine revetment at an estimated cost of \$20,000; Berlin Bend, mile 311, continuation of temporary emergency work from last year, 6,700 linear feet of fascine mattress, no paving, at an estimated cost of \$27,000; Petite Saline Creek, mile 185, 1,800 linear feet of standard revetment at an estimated cost of \$20,000; Lupus, Mo., mile 182, repairs to existing work, 786 linear feet standard revetment, at an estimated cost of \$6,700; Sandy Hook, mile 173, repairs to existing work, 4,240 linear feet of standard revetment, at an estimated cost of \$39,000; Marion, Mo., mile 166, repairs to existing work, 2,550 linear feet standard revetment, at an estimated cost of \$14,200; New Haven, Mo., right bank, mile 87, the citizens extended the standard revetment both up and down stream from that constructed last year a total of 1,683 linear feet, at an approximate cost of \$5,788. The Chicago, Burlington & Quincy Railroad Co., for protection of its bridge at Bellefontaine, Mo., extended the standard revetment upstream on left bank at mile 9, 500 linear feet and repaired the existing work at an estimated cost of \$25,119.05.

The total expenditures to June 30, 1916, under existing project, beginning with the appropriation of June 25, 1910, for systematic work on the 6-foot channel, amounted to \$4,869,546.03, divided as follows:

New work, surveys, and superintendence.....	\$3, 624, 093. 50
New plant and maintenance of plant.....	648, 231. 31
Maintenance of works.....	398, 266. 02
Snagging and snag-boat repairs.....	197, 165. 31

APPROPRIATIONS.

Prior to existing project (see H. Doc. No. 1491, 63d Cong., 3d sess., pp. 496-498)-----	\$7,663,130.48
Existing project:	
June 25, 1910-----	\$1,000,000.00
July 25, 1912-----	800,000.00
Aug. 24, 1912-----	800,000.00
Mar. 4, 1913-----	2,000,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)-----	850,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)-----	1,000,000.00
July 27, 1916-----	1,500,000.00
	<hr/> 7,750,000.00
Total of appropriations-----	15,413,130.48
Aug. 26, 1912, deficiency act (claim for damages by collision)---	18.75
Received from sale of maps-----	108.56
Receipts from sales, etc-----	<hr/> 3,835.69
Grand total-----	<hr/> 15,417,093.48

CONTRACTS IN FORCE.

Name of contractor: Munn-Relse Construction Co., Kansas City, Kans.
 Character of work: Construction of 1,030 feet of 3-row dike with fascine crib fill at mouth Kansas River.
 Price: 3-row dike, \$9.70 per linear foot; foot mattress, \$11.05 per linear foot; fascines, \$4.25 per cord.
 Date of approval: April 13, 1915.
 Date of beginning: April 10, 1915.
 Date of expiration: June 30, 1915. Time limit waived.
 Completed: December 3, 1915.
 Per cent completed: 100.

Name of contractor: Marshall Rust, Pilot Grove, Mo.
 Character of work: Construction of 5,400 feet of standard revetment in Randolph Bend.
 Price: \$9.55 per linear foot.
 Date of approval: April 28, 1916.
 Date of beginning: May 11, 1916.
 Date of expiration: November 1, 1916.
 Per cent completed: None.

Name of contractor: J. W. McMurry Contracting Co., Kansas City, Mo.
 Character of work: Construction of 4,200 feet of standard dike at Blue Mills and Sissons Bends.
 Price: \$14.25 per linear foot.
 Date of approval: June 7, 1915.
 Date of beginning: June 29, 1915.
 Date of expiration: April 19, 1916. Extended by high water.
 Per cent completed: None.

Name of contractor: Marshall Rust, Pilot Grove, Mo.
 Character of work: Construction of 9,000 feet of standard revetment at Jacksons Bend.
 Price: \$9 per linear foot.
 Date of approval: June 7, 1915.
 Date of beginning: June 27, 1915.
 Date of expiration: June 17, 1916. Extended by high water.
 Per cent completed: None.

¹ Prior to 1910 appropriations for this section of the river were combined with those for other sections and can not be given separately. The figures used were obtained by as complete an analysis as can be made from the records. See consolidated list of appropriations at end of report on Missouri River.

Name of contractor: DeWitt & Shobe, Glasgow, Mo.

Character of work: Construction of 5,900 feet of standard 8-row dike at Napoleon and Upper Camden Bends.

Price: \$13.48 per linear foot.

Date of approval: July 1, 1915.

Date of beginning: July 17, 1915.

Date of expiration: July 7, 1916. Extended by high water.

Per cent completed: None.

Name of contractor: Rust & Swift, St. Louis, Mo.

Character of work: Construction of 18,000 feet of standard revetment at Napoleon Bend.

Price: \$10.09 per linear foot.

Date of approval: March 31, 1914.

Date of beginning: April 19, 1914.

Date of expiration: July 9, 1915.

Completed: October 29, 1915.

Per cent completed: 100.

Name of contractor: Kansas City Bridge Co., Kansas City, Mo.

Character of work: Construction of 5,500 feet of standard dike at Bakers Bend.

Price: \$13.70 per linear foot.

Date of approval: July 2, 1915.

Date of beginning: July 17, 1915.

Date of expiration: July 7, 1916. Extended by high water.

Per cent completed: 92.

Name of contractor: Marshall Rust, Pilot Grove, Mo.

Character of work: Construction of 10,000 feet of standard revetment at Bakers Bend.

Price: \$10.15 per linear foot.

Date of approval: October 17, 1913.

Date of beginning: October 31, 1913.

Date of expiration: October 21, 1914. Time limit waived.

Per cent completed: 76.

Name of contractor: Marshall Rust, Pilot Grove, Mo.

Character of work: Construction of 1,000 feet of standard dike and 5,000 feet of standard revetment at Bakers Bend.

Price: \$13.85 per linear foot for dike; \$8.55 per linear foot for revetment.

Date of approval: July 2, 1915.

Date of beginning: July 16, 1915.

Date of expiration: July 6, 1916. Extended by high water.

Per cent completed: None.

Name of contractor: DeWitt & Shobe, Glasgow, Mo.

Character of work: Construction of 2,250 feet of standard dike and 12,000 feet of standard revetment at Euphrase Bend.

Price: \$12.95 per linear foot for dike; \$8.34 per linear foot for revetment.

Date of approval: July 2, 1915.

Date of beginning: July 17, 1915.

Date of expiration: October 7, 1916. Extended by high water.

Per cent completed: Revetment, 45; dike, none.

Name of contractor: Kansas City Bridge Co., Kansas City, Mo.

Character of work: Construction of 13,000 feet of standard revetment at Plow Boy Bend.

Price: \$9.25 per linear foot.

Date of approval: March 19, 1914.

Date of beginning: April 3, 1914.

Date of expiration: March 24, 1915. Time limit waived.

Completed: February 28, 1916.

Per cent completed: 100.

Name of contractor: Kansas City Bridge Co., Kansas City, Mo.

Character of work: Construction of 18,000 feet of standard revetment at Burlington Bend.

Price: \$8.18 per linear foot.
 Date of approval: October 15, 1915.
 Date of beginning: November 1, 1915.
 Date of expiration: October 22, 1916.
 Per cent completed: None.

Name of contractor: DeWitt & Shobe, Glasgow, Mo.
 Character of work: Construction of 4,350 feet of standard 3-row dike in
 Murrys and Chamois Bends.

Price: \$14.40 per linear foot for high section; \$13 per linear foot for low
 section.

Date of approval: April 14, 1916.
 Date of beginning: May 5, 1916.
 Date of expiration: February 25, 1917.
 Per cent completed: 5.

COMMERCIAL STATISTICS.

KANSAS CITY TO THE MOUTH.

Season of navigation, calendar year 1915: Opened March 26; closed Decem-
 ber 13.

Vessel classification.

Classes.	Number.	Net registered tonnage.
Registered:		
Steamer.....	7	407
Gasoline.....	5	128
Unregistered barges.....	13	6,080
Registered barges.....	1	68
Total.....	26	6,683

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
Grain.....	103,438 bushels.....	2,339	\$79,819.65	<i>Miles.</i> 43	0.0162
Hay.....	.....	224	2,660.00	56	.0168
Feed and flour.....	.....	13,115	472,124.10	378	.0035
Oil.....	313 barrels.....	71	2,002.00	8	.0260
Manufactured iron and steel.....	.....	4,719	384,517.00	381	.0081
Live stock.....	3,267 head.....	1,124	184,830.00	21	.0801
Salt.....	218 barrels.....	31	354.00	8	.0481
Sand and gravel.....	776 cubic yards.....	977	865.60	10	.0532
Brick.....	50,555.....	94	523.15	39	.0290
Cement.....	917 barrels.....	175	1,433.50	37	.0235
Lumber.....	389,585 feet b. m.....	938	9,043.60	22	.0532
Other building material.....	.....	62	5,923.50	8	.1056
Railroad ties.....	2,136.....	160	1,123.00	15	.0628
Produce.....	.....	100	12,750.65	8	.1553
Wood and coal.....	.....	741	2,314.00	29	.0628
Miscellaneous.....	.....	10,299	6,260,843.35	376	.0115
Riprap, willows, etc., used by pri- vate parties for bank protection.....	.....	7,535	15,575.00	32	.0125
Towing foreign barges.....	.....	345	.....	50	.0290
Sand and gravel barged.....	127,234 cubic yards.....	167,371	30,605.20	1	(1)
Railroad ties rafted.....	81,001.....	6,075	40,065.50	15	.0181
Total.....	.....	216,490	7,516,372.80	.....	.....

1 Owner.

Total ton-miles, 12,538,843.

2. MISSOURI RIVER, KANSAS CITY, MO., TO SIOUX CITY, IOWA.

All work in this section during the year was done with hired labor and Government plant, as follows:

*Decatur, Nebr. (right bank, mile 745; see pl. 5¹).—*Six 3-row dikes were built from 1911 to 1913 to maintain the channel in front of the city. Dike No. 6 was damaged in June, 1915, by failure of the shore root and settlement along the dike itself, due to scour, and a strong current broke through the breach at the bank and attacked the unprotected water front below. Emergency repairs were made during the latter part of August at a cost of \$296.39. The brush and rock crib at the root of Dike No. 6 was rebuilt and 240 linear feet of this dike and of Dike No. 3 was rescreened. The shore end of Dike No. 2 failed in November. Owing to the lateness of the season extensive repairs could not be made, but brush was taken from a passing tow and the crib rebuilt November 12–16, effectively checking the damage. Cost of repairs was \$131.87.

When the ice moved in the spring of 1916 it swung into the dikes, utterly destroying them, with the exception of Dike No. 1, which lay out of the ice path and escaped with slight injuries. Only the stub end next to the bank remains of one of the dikes, the other four being completely destroyed.

*Council Bluffs, Iowa (left bank, mile 663).—*No work was done in this locality during the year, but outstanding liabilities from the previous year amounting to \$2,887.01 were paid. The balance of contributed funds, \$156.21, will be held for further repairs and renewals when required.

*Bonton Bend (left bank, mile 487; see pl. 6¹).—*The revetment built in 1886–87 was worn out; 2,000 feet of it had been replaced by new work in 1913–14 and 3,500 feet additional of the old work was destroyed in 1915. Brush parties went into the field in the fall of 1915 and a quarry was opened near Wathena, Kans., from which 7,000 tons of rock were quarried. Most of the material was brought to the site of the work by the towboat *Bonneville* after the ice had run out of the river in the spring. Grading of bank began November 1 and was completed December 10, a total of 3,600 feet, of which 2,500 feet was accomplished by team and slip and the remainder with hydraulic grader. Revetting was practically at a standstill during the winter, and the graded slope unprotected by mattress crumbled under attack by the current until 2,700 feet of finished grade had been lost. The caving spread downstream under the scour which destroyed the old revetment and increased the length of repair work to about 5,000 feet. Regrading of bank was resumed on March 21, 1916. At the end of the fiscal year 4,960 feet of mattress had been woven and 3,060 feet of revetment had been completed. Expenditures during the fiscal year amount to \$36,236.94.

*Quindaro Bend (right bank, mile 398; see pl. 7¹).—*Repairs to the revetment below the present intake of the Kansas City, Mo., pumping station, constructed in 1886, were in progress at the beginning of the fiscal year, although high water forced a suspension of active bank work from May 27 to October 10, 1915. (See hydrograph of Missouri

¹ Not printed.

River, mile 391, pl. 3.) During a part of this interval the river was out of its banks, submerging all work and disarranging unballasted mattress, so that upon resumption of work approximately 375 feet of this mattress had to be cut away and 450 feet of bank required regrading. The revetment was rebuilt for 840 feet using standard mattress, 500 feet was rebuilt with a narrow mattress, and the slope partially repaved for 280 feet where the original mattress was intact. A bight at the lower end of the repaired revetment was closed by a 230-foot longitudinal 2-row dike with a cross dike of 60 feet in length from its middle to the bank. Both dikes are more than half buried in the fill that has occurred since their completion.

The repairs of 1,850 linear feet of bank were completed December 13, 1915, at a cost to the United States of \$7,347.91, of which \$6,557.70 was expended during the fiscal year. The water departments of Kansas City, Kans., and Kansas City, Mo., and united private interests contributed \$2,500 each as half the estimated cost of repairs. Of the \$7,500 contributed, \$6,503.04 was expended, \$2,065.74 being expenses during the fiscal year. The balance, \$996.96, will be held for further repairs and renewals when required.

Snag boat "McPherson" (Capt. J. Fred Fariss, master).—On July 1, 1915, the *McPherson* was at mile 626 above the mouth, bound downstream. She reached Kansas City July 3 to undergo repairs while waiting for the June freshet to pass, and began snagging operations for the fiscal year with departure upstream on July 12. A sand pump and boiler were salvaged from the wreck of a sand digger near Elwood, Kans., four days later, and building material for a Government coal shed taken aboard at Omaha on August 2 was unloaded at Decatur, Nebr., on the 7th. From August 13 to September 3 the snag boat was engaged in operations above Sioux City. Repairs to rudder were completed September 8, and she arrived at Kansas City September 15. Working upstream, the snag boat reached Council Bluffs October 26 and took a pile driver and a quarter boat in tow and loaded all other property at this place, delivering it at Sioux Harbor on November 2. The snag boat returned on November 4 to Decatur, where she had left off snagging in October, and resumed snagging upstream, reaching Sioux City November 10. She was engaged above Sioux City from November 11 to 17, when she entered winter quarters on the Big Sioux River.

After completion of necessary repairs the *McPherson* left the harbor April 17, 1916, on an inspection trip with the district officer aboard and a quarter boat and a barge in tow, arriving at Kansas City on April 27. After rudder repairs at Kansas City the boat resumed snagging operations on May 1 and arrived at Sioux ice harbor on June 10. Barges *Nos. 612* and *617* were taken in tow on the 12th and dropped at Bonton Bend June 16. The *McPherson* arrived at Kansas City June 17 and departed upstream on the 21st. At the end of the month she was coaling at Rulo, Nebr., mile 537 above the mouth.

The work accomplished was as follows: One thousand one hundred and twenty-five snags and 57 rack heaps removed from the channel and 378 trees on caving banks felled and topped; 1,578 miles of river worked over and 3,244 miles run; in commission 188 days.

Expenses during the year.

Operations	\$8,364.23
Repairs	3,001.19
Subsistence	3,114.08
Fuel	2,852.52
Total	17,331.97

PLANT.

Coal sheds for supplying the snag boat and towboats have been built as follows:

Location.	Mile.	Construction period.	Capacity (tons).	Paid during fiscal year.	Total cost.
Decatur	745	Aug. 13-21, 1915.	125	\$626.72	\$636.32
Omaha	659	July 8-19, 1915..	125	595.38	598.83
Nebraska City	608	Aug. 4-11, 1915..	80	561.30	567.70
Rulo	537	July 20-26, 1915..	125	584.24	588.29
St. Joseph	479	Mar. 8-15, 1915..	125	105.59	527.50

The sheds have foundation, floor, and frame of wood, and galvanized corrugated-steel sides and roof. The 420 miles of river between Kansas City and Sioux City is now served by coal sheds from 58 to 89 miles apart.

The towboat *Bonneville* entered this division of the river and began towing for the Bonton Bend revetment in November, 1915. Much of the brush for this revetment was transported long distances. The boat was disabled by a broken rudder at Decatur, Nebr., November 12-16. She was forced by running ice to go into winter quarters opposite Nebraska City, Nebr., on December 11, and did not resume work until March 9, 1916, when the river was comparatively free from ice.

Outstanding liabilities of \$22.35 against the towboat *Bonneville*, constructed during the previous fiscal year, were paid, the repairs cost \$608.49. Costs of repairs to other floating plant were as follows: Launch *Sioux*, \$3.27; barge *No. 609*, \$5.44; barge *No. 7*, \$4.90; pile driver *No. 1*, \$31.36. Minor construction and maintenance repairs required by the boat yard at Sioux Harbor cost \$352.60.

Sioux Ice Harbor, S. Dak.—Care of plant at this harbor, belonging to the middle division of the river, cost \$1,292.10.

Council Bluffs, Iowa.—The watch force employed in caring for Government property was abolished when the snag boat *McPherson* took pile driver *No. IV-S* and office boat *No. 99* to Sioux Harbor on October 26. Up to that date care of plant cost \$190.42.

Nebraska City, Nebr.—Care of plant (towboat *Bonneville* and two barges) cost \$324.17.

St. Joseph, Mo.—Care of plant at this place cost \$803.21.

Quindaro, Kans.—All plant employed in revetment operations was transferred to other localities. Barge *No. EP-1* and pile driver *No. 1* were taken to St. Joseph on October 26. The towboat *Lieut. Augustin* left for the river below Kansas City on December 5 with the last of the fleet, consisting of office boat *No. 101* and barges Nos. 150, 151, and 601.

There was expended during the fiscal year \$2,297.83 for miscellaneous items of property.

IMPROVEMENTS OTHER THAN GOVERNMENT WORK.

The improvements during the year other than Government work and without cooperation were as follows:

Parkville, Mo. (left bank, mile 400).—Dikes to the extent of 1,500 feet and 2,600 feet of revetment, constructed by the Water Department, Kansas City, Mo., to maintain the river in its course past the water works intake, met with destruction. The work of the year comprised a revetment 2,658 feet in length and 302 feet of 2-row dike, built at a cost of \$29,578.

Pope, Kans. (right bank, mile 413).—The Missouri Pacific Railway Co. is repairing 200 feet of revetment and building 500 feet of additional revetment, using a fascine construction, at an estimated cost of \$5,000.

Near Leavenworth, Kans. (right bank, mile 417).—The Missouri Pacific Railway Co. is repairing 200 feet of revetment and building 1,500 feet additional revetment, fascine type, at an estimated cost of \$12,000.

Council Bluffs, Iowa (left bank, mile 663).—The Illinois Central Railroad Co. has expended \$4,142 in the partial construction of 700 feet of revetment. Work has been discontinued since April 1, 1916.

The Chicago, Burlington & Quincy Railroad Co. has expended \$126,700 for work done during the year for the protection of its property on this division of the river at the following localities:

Folsom, Iowa (left bank, mile 642).—Revetment repairs, 1,800 feet. Cost, \$19,138.

Opposite Plattsmouth, Nebr. (left bank, mile 634).—Revetment, 419 feet. Cost, \$2,874.

Barney, Nebr. (right bank, mile 595).—Revetment, 250 feet. Cost, \$2,496.

Opposite Rulo, Nebr. (left bank, mile 539).—Revetment 750 feet rock and brush dikes, 60 and 225 feet. Cost, 21,302.

Rulo, Nebr. (right bank, mile 538).—Revetment, 125 feet; brush dike, 100 feet. Cost, \$1,786.

Nodaway, Mo. (left bank, miles 502 and 501).—Work comprising 3,998 feet of revetment construction and repairs, under way last year, is still in progress. Cost to date, \$78,086.

Bonton Bend, Mo. (left bank, mile 489).—Repair and extension of revetment, 2,050 feet. Cost to date, \$21,813.

St. Joseph, Mo. (left bank, mile 481).—Paving bank. Cost, \$2,364.

Parkville, Mo. (left bank, mile 401).—Work in progress during fiscal year 1915, comprising 1,100 feet revetment and 170 feet fascine protection, was completed. Total cost, \$12,772.

Kaw Bend, Mo. (left bank, mile 394).—Repairs to revetment. Cost, \$2,430.

APPROPRIATIONS.

Appropriations prior to July 25, 1912	\$2,701,886.59
July 25, 1912	75,000.00
Mar. 4, 1913	150,000.00
Oct. 2, 1914 (allotted Oct. 7, 1914)	50,000.00

¹ Prior to 1912 appropriations for this section were combined with those for other sections and can not be given separately. The figures used were obtained by as complete an analysis as can be made from the records. See consolidated list of appropriations at end of report on Missouri River.

Mar. 4, 1915 (allotted Apr. 1, 1915)-----	\$50,000.00
July 27, 1916-----	125,000.00

Total of appropriations-----	3,151,886.59
Received as contributed funds-----	66,222.80
Received for transfer of towboat <i>Lewis</i> -----	15,000.00
Received from other sources-----	973.98

Total----- 3,234,083.37

COMMERCIAL STATISTICS.

Season of navigation calendar year 1915: Opened April 1; closed November 15.

Vessel classification.

Classes.	Number.	Net registered tonnage.
Registered:		
Steamer-----	2	37
Gasoline-----	2	105
Unregistered barge-----	1	100
Total-----	5	242

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Grain-----	25,000 bushels-----	800	\$16,000.00	100	0.0250
Salt-----	200 barrels-----	32	600.00	100	.0637
Brick-----	40,000-----	80	400.00	100	.0500
Cement-----	50 barrels-----	10	130.00	100	.0250
Lumber-----	20,000 feet b. m.-----	30	1,200.00	100	.0250
Other building material-----	45-----	45	2,000.00	100	.0222
Produce-----	15-----	15	1,500.00	100	.0226
Miscellaneous-----	75-----	75	3,590.00	100	.0426
Logs and lumber rafted-----	-----	-----	500.00	20	.0250
Sand barged-----	79,560 cubic yards-----	100,235	29,854.00	2	(¹)
Total-----	-----	101,822	55,774.00	-----	-----

Total ton-miles, 224,910.

¹ Owner.

3. MISSOURI RIVER, SIOUX CITY, IOWA, TO FORT BENTON, MONT.

All work in this section during the year was done with hired labor and Government plant, as follows:

Elk Point, S. Dak. (left bank, mile 485; see pl. 4¹).—Construction of dikes to replace destroyed bank protection near the upper end of Elk Point revetment, in progress at the beginning of the fiscal year, was delayed on account of high water until August 23, when pile driving was resumed and the work prosecuted without interruption

¹ Not printed.

until completed, December 1. After the recession of high water in July, 1915, an additional 750 feet of revetment was destroyed, increasing the damaged portion from 1,450 to 2,200 linear feet. A low 2-row longitudinal curved dike 2,310 feet in length, masking the exposed bank, was constructed; also four cross dikes ranging from 20 to 135 feet in length, a total of 2,645 linear feet of dike and 2,500 feet of foot mattress. To lessen the number and length of cross dikes and to obtain a larger measure of safety against ice and scour for the main dike, the latter was driven in a gentle curve concave to the river and conforming roughly to the changed bank line, which had retreated over 200 feet at the middle from the position held by the destroyed revetment.

Following the ice break-up of 1916, the current swung into the bank above the longitudinal dike, breached the revetment and flanked the dike, rendering it useless so far as resistance against erosion was concerned. The longitudinal dike now stands in deep water, partly destroyed, and a strip of land 2,500 feet in length has been eroded to varying widths in its rear.

A small break involving 60 linear feet of paved slope 3,000 feet above the lower end of the revetment was repaired in July, 1915, with 77 fascines. Owing to lack of funds repairs were not made to the 1,500 linear feet of damaged paving at the lower end of the revetment where temporary repairs had been made during May and June, 1915. The current has now left the bank in this part of the bend; and the need of repairs does not appear more urgent than when they were first required.

The total cost of repairs was \$25,593.36, of which \$18,323.13 was expended during the fiscal year.

Dakota County, Nebr. (right bank, mile 808, opposite Sioux City, Iowa.)—For a distance of 75 feet about one-half the paved slope of the Dakota County revetment slid into the river after being undermined by the high water following the ice break-up. The slide was faired out with fascines and resurfaced with rock, March 29 to April 7, 1916, at a cost of \$135.36.

SNAGGING.

Snag boat "Mandan" (Capt. Jas. Charlesworth, master).—From the beginning of the fiscal year to July 24 the *Mandan* was employed in clearing the channel between mile 586 above Sioux City and Mondak, Mont., a 380-mile stretch of river. From Mondak the boat dropped downstream to Bismarck, stopping several times to cut trees on caving banks. She left Bismarck on August 2 to work over the river between that place and Williston, went from Williston on September 1 to Mobridge, S. Dak., and resumed snagging upstream on September 13, reaching Williston again on October 5. During the week of October 15-21 the 20 miles of river below Rockhaven, N. Dak., was snagged. She was pulled out on the Government ways at Rockhaven Harbor October 30 and the crew was disbanded on November 3, with the exception of the engineer and assistant, who were employed another month on needed repairs.

The vessel was overhauled in March for the season's work, and launched on March 20, 1916. Boiler inspection took place on April 4, but heavy ice held the boat until April 13, when she departed

downstream to mile 610 above Sioux City. The *Mandan* snagged from this point to Fort Benton, Mont., 864 miles above, between April 15 and June 16. On June 24 she departed downstream on an inspection trip with the district officer aboard, stopping en route to load the camping outfits of two winter snagging parties which had been stored near the river at the close of the winter's work. The *Mandan* arrived at the Government harbor, Rockhaven, N. Dak., at the close of the fiscal year.

The work accomplished was as follows: One thousand two hundred and eighty snags and 182 rack heaps removed from the channel and 4,366 trees on caving banks felled and topped; 1,931 miles traveled upstream and 1,873 miles downstream; and in commission 201 days.

Expenses during the year.

Operations	\$8,039.09
Repairs	1,066.51
Subsistence	2,827.53
Fuel	1,523.46
Total	14,056.59

*Snag boat "McPherson" (Capt. J. Fred Fariss, master).—*The *McPherson* entered this division of the river on August 13 and reached mile 280 above Sioux City August 26. She returned to Sioux City on September 3 and resumed work on the river below Sioux City. From November 11 to 17 the *McPherson* was engaged in snagging operations between Sioux City and Elk Point, S. Dak. On November 17 she entered winter quarters on the Big Sioux River. No work was done by the *McPherson* on this part of the river during the calendar year 1916. Operations for the fiscal year were as follows: Two hundred and seven snags and two rack heaps removed from the channel and 10 trees on caving banks felled and topped; 319 miles traveled upstream and 319 miles downstream; and in commission 27 days.

Expenses during the year.

Operations	\$1,898.26
Repairs	561.25
Subsistence	698.53
Fuel	633.29
Total	3,791.33

Winter operations.—Three parties were placed in the field above Bismarck, N. Dak., to remove snags, rocks, and other obstructions which could not be advantageously handled by the snag boat. Party No. 1 conducted operations on the worst section of the river in North Dakota, between miles 110 and 145 above Bismarck, from November 24, 1915, to February 29, 1916. Party No. 2 worked near the mouth of Musselshell River, Mont., miles 620 to 625 above Bismarck, from December 13, 1915, to February 11, 1916. The third party continued the work of the previous season at Bird Rapids, Mont., mile 718 above Bismarck, from December 7, 1915, to January 29, 1916. The Montana parties were seriously handicapped by extreme cold, deep snows, and high water. Heavy ice gorges flooded the channel rocks, which can be drilled for blasting only at low water, and when

the gorges broke, the flood water from melting snows terminated the work. A summary of results and cost of winter operations follows:

Item.	Party No. 1.	Party No. 2.	Party No. 3.	Total.
River worked over.....miles.....	7	5	1	13
Rocks blasted.....	162	35	31	226
Snags destroyed.....	10	69		79
Trees felled and topped.....	1,478	975		2,453
Blasting rocks.....	\$1,224.74	\$548.18	\$737.32	\$2,510.24
Blasting snags.....	22.45	162.47		184.92
Cutting trees.....	126.90	190.86		317.76
Outfitting, disbanding, and moving camp.....	663.51	747.01	258.62	1,669.14
Explosives and supplies.....	143.29	37.34	11.10	191.73
Subsistence.....	835.76	503.49	380.19	1,719.44
Care and repair of plant.....	354.12	164.14	214.37	732.63
Administration.....	219.64	164.03	95.53	469.20
Total.....	3,590.41	2,507.62	1,697.13	7,795.06

PLANT.

*Rockhaven Harbor, N. Dak. (mile 1,455 above mouth).—*Work was confined to painting residence occupied by the watchman retained to care for property and plant and care of the snag boat *Mandan* through the winter. The interval between the river and the lower end of concrete boatways was bridged with temporary timbers and the boat hauled out on October 30, 1915. Repairs were made to the firebox, engines, and pumps; worn-out deck plates were replaced; a steam-heating coil was installed in the pilot house; the paddle wheel was rebuilt; hull scraped and painted, both inside and outside; and the cabins and superstructure cleaned and painted. None of the plant at the harbor received extensive repairs, as there was no work in view for which it could be used, and during the year it had suffered only the deterioration of disuse. Ordinary repairs and maintenance of the harbor during the fiscal year cost \$579.39.

*Sioux Ice Harbor, S. Dak. (situated 1 mile above mouth of Big Sioux River, or 81½ miles above mouth of Missouri River).—*The shops were closed and two employees were able to care for plant, property, and materials. General harbor charges against this division amounted to \$1,434.55. Charges against individual floating plant for repairs were as follows: Launch *Sioux*, \$3.19; barge No. 609, \$5.32; barge No. 7, \$4.79. Outstanding liabilities of the previous fiscal year of \$35.04 against the towboat *Bonneville* were paid. Final cost of the boat was \$17,933.89. The trial trip was made on June 7, 1915, but she was laid up at the harbor from June 28 to July 24 with a broken wheel shaft. Floating plant used in dike and revetment construction at Elk Point, S. Dak., and Council Bluffs, Iowa, was received on October 31 and November 2, 1915, respectively; and the snag boat *McPherson* was moored at the harbor from November 17, 1915, to April 13, 1916. Quarter boat No. 501 and barge No. 618 were taken in tow by the *McPherson* on leaving and transferred at Quindaro Bend to the towboat *Augustin* on April 27 for the river below Kansas City. Barges No. 602, No. 604, No. 605, and No. 606

were taken from the harbor on November 3, 1915, by the towboat *Bonneville* and barges *No. 612* and *No. 617* on June 12, 1916, by the *McPherson* to be used in revetment construction near St. Joseph, Mo.

Only one towboat, the *Bonneville*, was employed on the river above Kansas City. After lying at Sioux Ice Harbor for shaft repairs until July 24, 1915, she went into service for the Elk Point dike party, towing between Elk Point, S. Dak., and points below until November 3. On this date she departed downstream with four barges for revetment reconstruction in Bonton Bend, Mo.

Barge *No. 610*, a wooden barge 100 by 25 by 5 feet, loaded with brush, sank in Miners Bend, 21 miles above Sioux City, on July 10, 1915. Attempts at salvage were unsuccessful.

Barges *Nos. V-S* and *225* and survey boat *No. 301* were destroyed by fire on May 13, 1916, at Williston, N. Dak. This plant was unserviceable and of little value.

There was expended during the fiscal year \$693.98 for miscellaneous items of property.

IMPROVEMENTS OTHER THAN GOVERNMENT WORK.

Improvements during the year other than Government work and without cooperation were as follows:

Near Pierre, S. Dak. (left bank, mile 1164).—The Chicago & North Western Railway Co. repaired its fascine shore protection and four dikes. A 400-foot, 3-row spur dike, with foot mattress, was added to the group of dikes, and fascines were placed along 66 feet of shore line. Cost of all work was \$17,533.

Cheyenne River, S. Dak. (a tributary of Missouri River; left bank, mile 130).—The Chicago & North Western Railway Co. constructed a 300-foot, 2-row, rock-filled pile dike near Wasta to divert the channel from its tracks, at a cost of \$5,200.

APPROPRIATIONS.

Prior to existing project (see H. Doc. No. 1491, 63d Cong., 3d sess., pp. 496-498)	\$2,827, 268. 06 ¹
Existing project:	
July 25, 1912	\$150, 000. 00
Mar. 4, 1913	175, 000. 00
Oct. 2, 1914 (allotted Oct. 7, 1914)	50, 000. 00
Mar. 4, 1915 (allotted Apr. 1, 1915)	50, 000. 00
July 27, 1916	200, 000. 00
	625, 000. 00
Total of appropriations	3, 452, 268. 06
Received from transfer of towboat <i>Lewis</i>	15, 000. 00
Received for damage to snag boat <i>Mandan</i>	294. 42
Sale of maps	38. 06
Sale of property	125. 00
Grand total	3, 467, 725. 54

¹ Prior to 1912 appropriations for this section were combined with those for other sections and can not be given separately. The figures used were obtained by as complete an analysis as can be made from the records and include \$65,938.73 for Fort Benton to Stubbs Ferry. See consolidated list of appropriations at end of report on Missouri River.

COMMERCIAL STATISTICS.

Season of navigation, calendar year 1915: Opened April 1; closed November 15.

Vessel classification.

Classes.	Number.	Net registered tonnage.
Registered:		
Steamer.....	2	146
Gasoline.....	10	728
Barges registered and unregistered.....	3	180
Total.....	15	1,054

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
				Miles.	
Grain.....	407,870 bushels.....	12,236	\$439,496	79	0.0271
Coal.....	2,052	18,371	58	58	.0539
Manufactured iron and steel.....	68	35,224	75	75	.0289
Lumber and logs.....	761,000 feet b. m.....	1,708	16,875	58	.0573
Other building material.....	186	1,842	70	70	.0444
Miscellaneous.....	1,716	129,983	58	58	.0513
Oil.....	50 barrels.....	10	300	30	.1080
Total.....		17,976	642,090		

Total ton-miles, 1,292,924.

CONSOLIDATED STATEMENT OF APPROPRIATIONS AND ALLOTMENTS FOR MISSOURI RIVER.

Kansas City to mouth.....	\$6,250,000.00
Kansas City to Fort Benton.....	1,149,000.00
General improvement.....	65,000.28
Mouth to Fort Benton.....	1,655,000.00
Removal of obstructions.....	587,500.00
Mouth to Sioux City Iowa.....	8,506,079.35
Sioux City to Stubbs Ferry.....	635,000.00
Sioux City to Great Falls.....	465,000.00
Sioux City to Fort Benton.....	532,500.00
Above mouth of Yellowstone River.....	160,000.00
Above Fort Benton.....	15,000.00
Three Forks to Canyon Ferry.....	2,500.00
July 27, 1916.....	1,825,000.00
Total of appropriations.....	21,847,579.63
Amount returned to surplus fund of Treasury from deficiency act of Mar. 4, 1907.....	4,606.69
Net total.....	21,842,972.94
Aug. 6, 1912 (deficiency act).....	18.75
Total of United States funds.....	21,842,991.69
Total contributed funds less amounts returned to contributors.....	204,776.24
Total of United States and contributed funds.....	22,047,767.93
Total receipts from other sources (sales, etc.).....	71,134.46
Grand total.....	22,118,902.39

4. OSAGE RIVER, MO.

For general map of the river see plate 28.¹

General open-channel improvement.—The river has been at flood stage every month during the fiscal year. The highest water occurred February 1, 1916, being 32.8 feet above low water. The river was at and below the 3-foot working stage only 60 days during the year, hence the progress of the work was reduced to a minimum. At the beginning of the year work was in progress at Salt Island shoal, and at the close of the year is in progress at Wash Lamb Shoal, with the plant tide up awaiting a working stage.

During the year 9 miles of river were worked over, the work accomplished being as follows: Six snags removed from the channel, at a cost of \$40.68, or \$6.78 per snag; 225 trees felled from river banks, at a cost of \$281.27, or \$1.25 per tree; stone quarried, 3,560 cubic yards, at a cost of \$5,864.12, or \$1.647 per cubic yard; gravel dredged, 13,480 cubic yards, at a cost of \$2,170.61, or 16.1 cents per cubic yard; 4,908 linear feet of new wing dams and training walls constructed, at a cost of \$6,739.17, or \$1.37 per foot; and 92 linear feet of wing dams repaired, at a cost of \$110.51, or \$1.20 per foot. The total expenditures for improvement works, dredging, snagging, and repair of plant, superintendence and travel amounted to \$13,394.31.

Salt Island Shoal (98 miles above mouth).—At the beginning of the fiscal year about 37 per cent of this work had been completed. Work was begun December 22, 1914, and completed October 22, 1915, at a total cost of \$4,790.36, of which \$3,105.78 was expended last year. At the head of the shoal the flow was confined to the left bank by a 100-foot wing dam and 833 feet of training wall; at the foot of the shoal the flow was confined to the right bank by a 242-foot wing dam from the left bank and 355 feet of training wall. The channel was dredged to a minimum depth of 3 feet.

Au Glaize Shoal (95 miles above mouth).—Work was begun July 1915, and completed December 23, 1915, at a cost of \$4,387.97. The Au Glaize Creek, entering on the right bank at head of the shoal, had formed a bar at its mouth. To rectify this condition a training wall 1,653 feet in length was built along the right bank, and on the left bank a 93-foot wing dam was built to connect with a training wall 1,310 feet in length, built parallel to the right bank training wall and 90 feet center to center. On account of the shallow water over the shoal two cuts with the dredge were required. In this case the walls were built after the 3-foot channel had been dredged.

Rays Shoal repair work (94 miles above mouth).—This shoal was in very good condition, with a minimum depth of 2½ feet for a short distance. In view of the many shoals that required urgent attention, it was deemed advisable to delay work at this location. To close the break near right bank, at the head of the shoal, the old wing dam was repaired for a length of 92 feet. This repair work was accomplished on December 21 and 22, 1915, at a cost of \$110.51.

Wash Lamb Shoal (90 miles above mouth).—At this locality there are practically two shoals. The upper shoal required no work, but

¹ Not printed.

at the lower shoal the water spread out to a width of 500 feet, with a channel depth at low water of about 1 foot. It is proposed to confine the flow along the left bank in a channel 86 feet wide by building 424 feet of wing dam from the right bank and about 350 feet of training wall and dredging the channel to a depth of 3 feet. At the close of the year the work is in progress and about 70 per cent completed, at a cost of \$3,179.55. The work done is as follows: Four hundred and twenty-four linear feet of new wing dam completed, 338 linear feet of new training wall built, and 1,931 cubic yards of gravel dredged from the channel.

Wide Ford Shoal (89 miles above mouth).—The detailed survey has been made for laying out the work at this location, but owing to high water conditions no construction work has been done. Stone to the amount of 1,218 cubic yards has been quarried and stored at a cost of \$2,441.80. The excessive cost of quarrying is due to the fact that the pay of the entire force was charged to this item during the periods of enforced suspension on account of high water.

Snagging.—Nine miles of river were worked over in conjunction with open-channel improvement. The work done is as follows: Six snags removed from the channel and 225 leaning trees felled from the river banks where necessary, at a cost of \$321.95.

Plant repairs.—The plant used on open-channel improvement consists of dredge No. 1, towboat *Osage*, quarter boat *Z*, barge No. 4, and necessary small pieces. The work required for repairs and maintenance of the plant was done by the regular force during the periods of enforced suspension on account of high water.

Dredge "No. 1."—A set of nine new teeth was placed on the clam-shell bucket, sheaves were repaired, worn flues in the boiler were replaced, the grate bars and rests were replaced, the brasses on capstan engines were refitted, and the machinery was overhauled and repaired. Five new kevels were replaced with new ones made from native timber. The cost of repairs to machinery was \$91.69 and to the hull \$11.56, a total cost of \$103.25.

Towboat "Osage."—A new roof was placed on the pilot house and the coal bunkers and wheel were repaired. The machinery was overhauled and new flues were placed in the heater, worm piping was replaced, and globe valves were reground. The cost of repairs to cabin was \$28.04 and to the machinery was \$75.99, a total cost of \$104.03.

Quarter boat "Z."—The screen doors were repaired at a cost of \$3.25.

Barge "No. 4."—The deck was patched and the hull recalced above water line, at a cost of \$8.04.

Launch "Racket."—The machinery was overhauled and repaired at a cost of \$67.89.

General minor repairs were made to one skiff at a cost of \$3.30; wheelbarrows and tools were repaired at a cost of \$28.22; one new skiff of the flat-bottom type was built at a cost of \$38.16.

The total cost of repairs to plant was \$317.98, which has been prorated and charged to the various improvement works.

This work was under the general charge of Asst. Engineer G. C. Haydon. A. H. Riney, junior engineer, was in local charge of all the work to September 5, 1915, since which time it has been under

the local charge of Ernest M. Levy, junior engineer. John G. Auld, lock master, has had charge of the operation and care of the lock and dam, and George W. Russell, foreman, of the construction work of open-channel improvement. All work was done by hired labor, with Government plant.

APPROPRIATIONS.

Mar. 3, 1871	\$25,000.00
June 10, 1872	25,000.00
Mar. 3, 1873	25,000.00
June 23, 1874	25,000.00
June 18, 1878	20,000.00
Mar. 3, 1879	20,000.00
June 14, 1880	30,000.00
Mar. 3, 1881	20,000.00
Aug. 5, 1883	10,000.00
Aug. 11, 1888	5,000.00
Sept. 19, 1890	55,000.00
July 13, 1892	50,000.00
Aug. 18, 1894	46,000.00
June 3, 1896	50,000.00
Mar. 3, 1899	25,000.00
June 6, 1900	146,000.00
June 13, 1902	30,000.00
Mar. 3, 1905	80,000.00
Mar. 3, 1905 (emergency allotment Sept. 10, 1906)	10,000.00
June 13, 1902 (emergency allotment Sept. 10, 1906)	10,000.00
Mar. 2, 1907	78,000.00
May 27, 1908 (sundry civil act)	100,000.00
Mar. 3, 1909 (allotment July 23, 1909)	10,000.00
Mar. 4, 1909 (sundry civil act)	60,000.00
Mar. 4, 1909 (emergency allotment Mar. 12, 1909)	15,000.00
June 25, 1910	35,000.00
Feb. 27, 1911	15,000.00
July 25, 1912	15,000.00
Mar. 4, 1913	15,000.00
Mar. 4, 1915 (allotment Apr. 1, 1915)	7,500.00
July 27, 1916	15,000.00
Total	1,072,500.00
Total receipts from other sources	1,071.95
Total	1,073,571.95

COMMERCIAL STATISTICS.

Season of navigation, calendar year 1915: Opened March 15; closed November 30.

Vessel classification.

Classes.	Number.	Net registered tonnage.
Registered:		
Gasoline	3	31
Steam	2	62
Unregistered barges	2	40
Total	7	133

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
Grain.....	83, 416 bushels.....	2, 473	\$35, 270. 00	<i>Miles.</i> 21	\$0. 0994
Hay.....	194	194	3, 484. 00	36	. 0688
Feed.....	179	179	1, 612. 00	27	. 0682
Oil.....	454 barrels.....	87	2, 876. 00	23	. 1081
Manufactured iron and steel.....	39	39	6, 890. 00	19	. 1556
Live stock.....	8, 375 head.....	917	98, 370. 00	28	. 0633
Salt.....	865 barrels.....	135	1, 560. 00	31	. 0625
Sand and gravel by barge.....	4, 311 cubic yards.....	5, 615	3, 392. 50	1. 2	(¹)
Brick.....	32	32	160. 00	20	. 0366
Cement.....	1, 420 barrels.....	299	1, 794. 00	24	. 0603
Lumber.....	350, 100 feet b. m.....	755	5, 600. 00	31	. 0441
Wood and coal.....	175	175	525. 00	20	. 0381
Railroad ties.....	1, 053	90	475. 00	40	. 0222
Produce.....	34	34	1, 335. 00	22	. 1107
Miscellaneous.....	1, 638	1, 638	73, 718. 00	37	. 0782
Railroad ties, rafted.....	125, 138	9, 385	43, 200. 00	56	. 0117
Kaolin.....	354	354	248. 00	15	. 1103
Total.....		22, 083	330, 999. 50		

¹ Owner.

Total ton-miles, 735,060.

5. OPERATING AND CARE OF LOCK AND DAM NO. 1, OSAGE RIVER.

The work done during the year consisted of the general care and operation of the lock and dam, repair work, and the care and improvement of the grounds. All work was done by hired labor and the lock force with Government plant.

The 7-foot movable dam consists of 5 drum weirs and 100 chanoine wickets; during the year they were operated once as a whole, the extreme and continued high water making further operations unnecessary.

The weirs were hard to operate on account of deposits of earth and gravel, and it was necessary to use jackscrews in conjunction with the maneuvering barge to raise them. A rise in the river on November 26, 1915, caused a suspension of operations with 92 wickets and all weirs lowered to place (except No. 10 which is near the right bank) and they have remained in that position to the end of the year.

A light run of ice for two days did not suspend navigation. The river was over the lower lock wall a total of 54 days during the year, making the lockage of vessels impossible during this time. The lock was operated a total of 175 times.

The accumulation of deposit in the lock chamber and above the upper gates, 1,007 cubic yards, was removed, and 397 cubic yards have been stored for filling the lock grounds. During the year 418 cubic yards previously stored was deposited on the yard.

General repairs.—To protect the bank line from scour below the lock chamber the bank was paved with 105 cubic yards of stone. The walks on top of lock gates were replaced with new lumber, and new covers were made for the openings in the lock wall.

Buildings and grounds.—All fences, trees, outbuildings, and cellars were whitewashed; the office roof was reshingled, and the porch floor repaired; the floors and interior woodwork in the residence and office

were varnished; the water tower and tank were repainted. A small shed was built of old cofferdam lumber for the protection of unused machinery.

Sidewalks.—To replace the worn and wooden walks, 1,165 linear feet of concrete sidewalks, including steps down to top of the lower lock wall, were built at a cost of \$759.62.

Plant.—A new landing float (15 inches by 7 feet by 22 feet) was built for the launch and anchored in place; the deck and boom of the maneuvering barge were repaired; barge *No. 3* was recalced above the water line; a new derrick box was made for the bank hoist; the machinery of the launch *Enquirer* was overhauled and repaired and the hull was painted and varnished inside and out; all boilers were inspected, tubes repaired, and smokestacks painted.

Survey.—Flowage rights were not secured at the time of the location of the lock and dam. Complaint is now made that the dam is the cause of damage to crops and lands at certain stages. To determine to what extent the dam has caused additional flooding of lands a survey was made for 11 miles above the lock site (above that point the river banks are high), and the notes have been plotted.

Itemized statement of the cost of the work during the year is as follows:

Pay of lock master.....	\$1,080.00
Pay of assistant lock master.....	720.00
Pay of 3 lockmen.....	1,786.67
Pay of extra help occasionally needed.....	31.77
Dredging lock chamber.....	23.33
Placing dredged material on grounds.....	78.00
Miscellaneous supplies (fuel, oils, etc.).....	256.29
Miscellaneous repairs to lock and dam.....	11.33
Miscellaneous repairs to buildings and sidewalks.....	843.19
Miscellaneous repairs and renewals of plant.....	162.97
Superintendence and office expenses.....	728.16
Total	5,731.76

EXPENDITURES.

Fiscal year ending June 30—

1913.....	\$5,024.53
1914.....	5,580.62
1915.....	5,893.45
1916.....	5,731.76
Total.....	22,230.41

6. GASCONADE RIVER, MO.

For general map of the river see plate 29.¹

General open-channel improvement.—The rainfall over the watershed was above normal and frequent rises delayed the work, especially during the first eight months of the year. Work was carried on during the winter months, and very little trouble was encountered

¹ Not printed.

from ice and winter conditions. At the beginning of the year work was in progress on repair work at Pryors Chute Shoal, and at the close of the year is in progress at Lottie Lewis Shoal with the force quarrying stone.

During the fiscal year 7.5 miles of river were worked over, the work accomplished being as follows: 365 snags removed from the channel at a cost of \$748.25, or \$2.05 per snag; 89 trees felled from river bank at a cost of \$45.17, or 51 cents per tree; stone quarried, 3,594 cubic yards, at a cost of \$2,776.75, or 77 cents per cubic yard; gravel dredged, 26,050 cubic yards, at a cost of \$4,506.86, or 13.5 cents per cubic yard; 1,950 linear feet of new wing dams and training walls constructed at a cost of \$5,714.02, or \$2.93 per foot; and 1,455 linear feet of wing dams and training walls repaired at a cost of \$5,132.40, or \$3.53 per foot.

The total expenditures for improvement works, dredging, snagging, and repair of plant, superintendence, and travel amount to \$14,435.10.

Pryors Chute Dam (32½ miles above mouth).—At the beginning of the fiscal year the plant was assembled awaiting the subsidence of the flood, and the force was occupied in quarrying stone. Work was begun July 2, 1915, and 330 linear feet of repairs were completed August 13, 1915. The highest water of the season occurred August 23, 1915, at which time the overfall carried out the top stone for a distance of 100 feet; this stone was replaced, and the work was completed October 12, 1915. High water during the latter part of November, 1915, again damaged the dam over a distance of 260 feet, and the stone was replaced complete March 25, 1916. The total length of dam repaired was 690 linear feet, at a cost of \$3,213.93, of which \$1,536.12 was expended for material stored last year.

Pryors Chute Shoal (32½ miles above mouth).—The work was begun August 10, 1915, and completed on the training wall October 7, 1915, and the work of dredging was discontinued December 31, 1915, at a total cost of \$7,314.75. The training wall at this location is built from the main right bank across head of the chute to left bank of the island, and at low water is intended to serve as the right bank of the river. When this training wall broke, it allowed a gravel bar to form across the main channel. The training wall was repaired for a distance of 665 linear feet at a cost of \$1,722.89, of which \$1,085 was expended for material stored last year. A total of 26,050 cubic yards of gravel was dredged from the bar and deposited below the training wall at a cost of \$4,506.86.

Pin Oak Shoal (26½ miles above mouth).—Work on the right bank of the river at this shoal was completed in December, 1915, and the work on the left bank began November 19, 1915, by quarrying stone. The construction work was completed March 20, 1916, at a cost of \$2,813.58. The wing dam extends out from left bank 150 linear feet, and the training wall extends up and down stream 850 linear feet, parallel with the right bank training wall, making a channel 80 feet wide, with a depth of 2 feet at low water. The right bank training wall was repaired for 100 linear feet at the head at a cost of \$195.58.

Campmeeting Shoal (25½ miles above mouth).—The work was begun March 27, 1916, and completed June 30, 1916, at a cost of \$2,900.44. This shoal was improved by changing an abrupt turn of channel flow to the left bank to a curved flow along the right bank, by the construction of a left-bank wing dam 100 linear feet and 850 linear feet of training wall along the left bank of the gravel bar.

Lottie Lewis Shoal (25 miles above mouth).—At the end of the year the plant is assembled at this location and the force occupied in quarrying stone and procuring poles. It is estimated that about 625 cubic yards of stone have been quarried and stored and 800 poles purchased and delivered at a cost of \$841.

Snagging.—Seven and one-half miles of river were worked over in conjunction with the open-channel improvement. The work done was as follows: 365 snags removed from the channel and 89 trees felled from the river banks where necessary at a cost of \$793.42.

Plant repairs.—The plant used on the open-channel improvement consists of power boat *No. 1*, gasoline towboat *Gasconade*, quarter boat *C*, barge *No. 1*, and necessary small pieces. The work required for repairs and maintenance of the plant was done by the regular force during the periods of enforced suspension on account of high water and consisted of painting the quarter boat, towboat, and power boat; a new paper roof was placed on the power boat and a general overhauling of the machinery was made. The temporary dredge borrowed from the Missouri River improvement was repaired and machinery overhauled at a cost of \$381.50. The total cost of repairs to plant was \$1,438.63, which has been prorated and charged to the various improvement works. Two new skiffs of the flat-bottom type were built at a cost of \$61.93.

This work was under the general charge of Asst. Engineer G. C. Haydon, with I. E. Goodrich, junior engineer, in local charge. All work was done by hired labor with Government plant.

APPROPRIATIONS.

June 14, 1880-----	\$5,000.00	June 25, 1910-----	\$20,000.00
Mar. 3, 1881-----	10,000.00	June 25, 1910 (emergency	
Aug. 2, 1882-----	10,000.00	allotment May 11, 1912) -	5,500.00
July 5, 1884-----	5,000.00	Feb. 27, 1911-----	10,000.00
Aug. 5, 1886-----	7,500.00	July 25, 1912-----	10,000.00
Aug. 11, 1888-----	5,000.00	Mar. 4, 1913-----	10,000.00
Sept. 19, 1890-----	4,000.00	Oct. 2, 1914 (allotted Oct.	
July 13, 1892-----	4,000.00	7, 1914)-----	15,000.00
Aug. 18, 1894-----	5,000.00	Mar. 4, 1915 (allotted Apr.	
June 3, 1896-----	5,000.00	1, 1915)-----	15,000.00
Mar. 3, 1899-----	15,000.00	July 27, 1916-----	10,000.00
June 13, 1902-----	10,000.00		
June 13, 1902 (emergency		Total-----	222,000.00
allotment May 31, 1904) -	1,000.00	Receipts from other	
Mar. 3, 1905-----	15,000.00	sources -----	124.81
Mar. 2, 1907-----	10,000.00		
Mar. 3, 1909 (allotment		Total-----	222,124.81
June 22, 1909)-----	15,000.00		

COMMERCIAL STATISTICS.

Season of navigation, calendar year 1915: Opened March 15; closed November 30, 1915.

Vessel classification.

Classes.	Number.	Net registered tonnage.
Registered:		
Steamer.....	2	80
Gasoline.....	1	25
Unregistered barges.....	1	40
Total.....	4	145

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul.	Rate per ton-mile.
Grain.....	47,388 bushels.....	1,501	\$49,695.90	<i>Miles.</i> 36	0.0022
Hay.....	164	164	2,012.00	24	.0020
Flour and feed.....	7	7	412.30	20	.0021
Oil.....	311 barrels.....	71	1,994.00	34	.0020
Manufactured iron and steel.....	91	91	17,597.00	29	.0024
Live stock.....	1,896 head.....	794	115,735.00	25	.0191
Salt.....	204 barrels.....	29	333.00	34	.0412
Sand and gravel.....	184 cubic yards.....	268	165.60	6	.0020
Brick.....	4	4	16.35	29	.0336
Cement.....	334 barrels.....	122	902.00	29	.0020
Lumber.....	77,650 feet b. m.....	189	3,132.45	29	.0026
Other building material.....	56	56	5,469.25	26	.0671
Produce.....	47	47	7,860.75	34	.0442
Wood and coal.....	173	173	351.50	10	.0380
Miscellaneous.....	266	266	29,782.50	27	.0653
Railroad ties rafted.....	243,675.....	18,276	105,416.60	81	.0114
Total.....		22,037	340,876.20		

Total ton-miles, 1,588,241.

7. KANSAS RIVER, KANS.

For the necessary survey and supervision of work done by public officials and private corporations two allotments have been made from the appropriation for "Examinations, surveys, and contingencies of rivers and harbors." The unexpended balance of these allotments on July 1, 1916, is \$720.02.

Systematic inspection.—During the year the work of reconstruction of bridges by various owners and the construction of levees and revetment by the Kaw Valley drainage district have been under supervision. The bridge and levee construction has been in conformity with the harbor lines established by the Secretary of War June 24, 1910. Two bridges have been completed, and three bridges are under construction. The removal of bank accretions during the year was as follows: Right bank, between Kansas City Southern Railway bridge and the mouth of the river, 53,840 cubic yards; left bank, under the Kansas City Terminal Railway bridge, 2,825 cubic yards.

The Kaw Valley drainage district built a 16-inch suction dredge, electrically driven, capacity 200 cubic yards per hour, for excavation of the river prism and filling in behind and building up the levee. From the left bank between the Argentine and Twelfth Street Bridges this dredge removed approximately 253,000 cubic yards.

The two old Kansas City Southern Railway bridge piers, 300 feet downstream from the Argentine Bridge, have been removed.

APPROPRIATIONS.

July 25, 1912.....	\$4, 000
Transferred under authority of the act of Mar. 4, 1915.....	4, 000
Net total.....	
June 25, 1910 (allotted December 30, 1911, from the appropriation for "Examinations, surveys, and contingencies of rivers and harbors").....	3, 000
Mar. 4, 1915 (allotted July 24, 1915, from appropriation for "examinations, surveys, and contingencies of rivers and harbors").....	1, 000
Total.....	4, 000

8. BANK PRESERVATION AT FORT RILEY MILITARY RESERVATION, KANS.

This bank-protection work was provided for in sundry civil act of March 4, 1909, its execution being assigned to the Engineer Department by the Secretary of War.

It consists of 1,500 linear feet of 2-row concrete pile dike and 400 linear feet of standard revetment. It was commenced October 4, 1909, and completed February 2, 1912, at an average cost of \$13.03 per linear foot for dike and \$6.40 per linear foot for revetment. All work was done by hired labor with Government plant, except the pile driving, which was done by contract.

No work was done during the year. The expenditures were for inspections of the work, which were made by the district officer November 11, 1915, and June 4, 1916. The works were found in good condition.

The funds on hand will be used to maintain the dike system and revetment as necessary.

No estimate of funds is submitted.

APPROPRIATION.

Mar 4, 1909 (sundry civil act).....	\$25, 000
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IMPROVEMENT OF RIVERS AND HARBORS IN THE NASHVILLE,
TENN., DISTRICT.

REPORT OF MAJ. H. BURGESS, CORPS OF ENGINEERS.

IMPROVEMENTS.

	Page.		Page.
1. Cumberland River, Tenn. and Ky.:		2. Operating and care of locks and dams on Cumberland River	
A. Above Nashville	2689		2702
B. Below Nashville	2692		

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 1160 TO 1172.

1. CUMBERLAND RIVER, TENN. AND KY.

The river is divided into two sections (a) above Nashville, 326.1 miles, and (b) below Nashville, 192.6 miles.

(A) ABOVE NASHVILLE.

The snagging party removed 444 large and 508 small snags, cut 186 leaning trees, and trimmed 29 trees, covering and clearing the river from Helm, Ky., to Lock No. 1, 269 miles. The work was done by hired labor with the use of snag boat *No. 1* and gasoline tender *No. 1*. The total amount spent for the snagging operations during the year was \$4,264.21.

The claim of Mrs. Josie Myer Reynolds for damages resulting from the construction of Dam No. 7 was settled during the year, the amount paid being \$181, as determined by the field examination. In addition to this amount, \$53.78 was expended in the preparation of abstract connected with this claim. Expenditures of \$13 were made during the year incident to examination in connection with suits for damages at Lock 21 pending in the Court of Claims.

The part of the claim of John and Zora E. Simpson relating to damages to land overflowed as a result of the construction of Dam No. 21 was settled prior to the fiscal year, the amount paid being \$171, as determined by the field examination. The part of this claim relating to the destruction of a creek ford is considered one for unliquidated damages that can not be settled by an executive officer. It is therefore recommended that \$100 be appropriated to pay for the destruction of the ford of the claimant.

The following is a list of the claims which have arisen on the Cumberland River on account of damages to lands by overflow due to the construction of dams, with present status:

Name of claimant.	When filed (fiscal year).	Dam No.	Amount claimed.	Amount determined by field examination.	Present status.
W. C. Capliener.....	1911	6	\$3,875	\$596.20	Paid.
J. A. Petty.....	1911	7	1,500	251.00	Court of Claims.
C. L. Porter.....	1911	7	3,200	130.60	Amount accepted; payment to be made as soon as satisfactory title is shown.
E. W. Duke.....	1911	7	1,500	332.80	Do.
A. H. Young.....	1911	6	3,000	758.00	Paid. ¹
Sam and C. S. Robinson.....	1911	7	1,000	51.00	Court of Claims.
J. W. Day.....	1912	5	500	216.00	Paid.
Wm. Franklin.....	1912	5	900	93.00	Do.
S. B. McMurtry.....	1912	5	1,800	69.00	Amount accepted; payment to be made as soon as satisfactory title is shown. ²
Mrs. Josie Myer Reynolds.....	1912	7	2,500	121.00	Paid. ³
Isaac S. Brown.....	1912	21	2,000	176.00	Court of Claims.
Wm. C. Daffron.....	1912	21	1,000	168.00	Do.
Thos. M. & M. T. Eads.....	1912	21	3,000	260.00	Do.
Joel A. Kinnett.....	1912	21	1,400	183.00	Do.
Wm. L. Scott.....	1912	21	2,000	834.00	Do.
Nathan L. Jones.....	1912	21	5,000	641.00	Do.
Marcellus Denney.....	1912	21	1,000	286.00	Do.
Theodore Johnson.....	1912	21	6,000	362.00	Do.
Hiram Taylor heirs.....	1912	21	(4)	290.50	
F. L. Barker.....	1912	21	1,000	162.50	Do.
H. B. Christian.....	1912 1913	21	6,000	418.50	{ United States district court, eastern district of Kentucky.
W. B. Cress.....	1912 1913	21	2,100	312.00	Do.
John Simpson.....	1913	21	500	271.00	\$171 paid; balance is for unliquidated damages.
W. G. Wall.....	1912	A	625	49.80	H. R. Bill.
J. E. Stewart.....	1912	A	1,400	473.00	Do.
S. H. Ellison, jr.....	1912	A	(4)	133.40	
Solomon H. H. Dunagan.....	1914	21	2,000	323.40	Court of Claims.
W. Robert Donnell.....	1914	4	600	36.35	Amount accepted; payment to be made as soon as satisfactory title is shown.
Total.....			55,400	7,991.85	
Claims paid.....				\$1,955.20	
Balance.....				6,036.65	

¹ Part of the land owned by Mr. Young in 1911 has been sold by him; this payment includes damages to balance (2 islands) of his land.

² Erroneously shown on this table given in Annual Report for 1915 as paid during the fiscal year 1915.

³ Not stated.

⁴ The amounts paid Wm. Franklin and John Simpson were inadvertently not taken into consideration in the amount given here in the Annual Report for 1915.

APPROPRIATIONS.

Previous projects (see H. Doc. 1491, 63d Cong., 3d sess., pp. 437-438).....¹ \$306,252.94

Present project:

Aug. 5, 1886.....	\$75,000.00
Aug. 11, 1888.....	200,000.00
Sept. 19, 1890.....	230,000.00
July 13, 1892.....	249,747.08
Aug. 18, 1894.....	200,000.00
June 3, 1896.....	20,000.00
June 4, 1897 (sundry civil act).....	350,000.00

¹ Includes \$20,252.94 expended under the canalization project for Smith Shoals and reported prior to 1915 as expended under the present project.

² Exclusive of \$20,000 expended on the previous project for the canalization of Smith Shoals.

³ Exclusive of \$252.94 expended on the previous project for the canalization of Smith Shoals.

Present project—Continued.

July 1, 1898 (sundry civil act)-----	\$250,000.00	
Mar. 3, 1899-----	100,000.00	
June 13, 1902 (amended)-----	200,000.00	
Mar. 3, 1905-----	124,000.00	
June 30, 1906 (sundry civil act)-----	120,000.00	
Mar. 2, 1907-----	150,000.00	
Mar. 4, 1907 (sundry civil act)-----	30,000.00	
May 27, 1908 (sundry civil act)-----	200,000.00	
Mar. 3, 1909 (maintenance), allotment dated Apr. 1, 1909-----	10,000.00	
Mar. 4, 1909 (sundry civil act)-----	250,000.00	
June 25, 1910 (maintenance)-----	10,000.00	
June 25, 1910 (Lock and Dam 21)-----	85,000.00	
Feb. 27, 1911 (Locks 3-7)-----	85,000.00	
July 25, 1912 (maintenance and flowage rights)---	7,500.00	
Mar. 4, 1913 (maintenance)-----	5,000.00	
July 27, 1916 (maintenance)-----	5,000.00	
	\$2,956,247.06	
Total of appropriations-----	3,322,500.00	
Transferred to "Below Nashville" by act of Mar. 4, 1915-----	40,000.00	
Total-----	3,282,500.00	
Received on account of failures of contractors (present project)-----	\$15,450.17	
Received from sales (present project)-----	1,831.10	
Cash deposit taken up, pay due sundry persons uncalled for (present project)-----	2.70	
	117,283.97	
Total receipts from all sources-----	3,299,783.97	

COMMERCIAL STATISTICS.

[Cumberland River above Nashville, Tenn., from Jan. 1 to Dec. 31, 1915.]

Season of navigation: Open all the year.

Vessel classification.

Registered steamers (American)-----	20
Net registered tonnage-----	1,294
Passengers-----	10,338

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
				Miles.	Cents.
Forest products:					
Logs-----	15,161,257 feet b. m.	45,502	\$455,020 ¹	55	0.94
Lumber-----	5,716,268 feet b. m.	11,432	228,640	79	1.75
Railroad ties-----	323,921-----	26,342	141,710	312	.68
Handles and slabs-----	605,267-----	681	17,025	209	.99
Hoops-----	252,000-----	252	3,780	237	.74
Posts-----	224,284-----	5,606	44,857	118	1.30
Spokes-----	765,399-----	1,531	30,620	176	.67
Staves and bolts-----	2,246,084-----	4,492	107,808	54	2.18
Farm products:					
Chickens-----	8,457 coops-----	507	202,800	173	2.68
Hay-----	4,391 bales-----	220	5,500	115	1.78
Produce-----	-----	2,582	206,560	194	2.07
Tobacco-----	2,264 hogsheads-----	1,698	407,520	227	1.34
Corn-----	127,798 bushels-----	3,578	96,606	240	.68
Oats-----	6,650 bushels-----	100	3,100	206	.85

¹ Exclusive of a reimbursement of overpayment amounting to \$17.25 included in reports prior to 1915.² 83,577 tons rafted.³ 10,318 tons transported by owners.⁴ 1,613 tons transported by owners.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
Farm products—Continued.				<i>Miles.</i>	<i>Cents.</i>
Wheat.....	56,320 bushels.....	1,705	\$75,020	193	0.88
Rye.....	492 bushels.....	16	540	281	.57
Live stock—					
Cattle.....	3,324 head.....	1,662	199,440	115	2.12
Horses.....	70 head.....	35	12,600	157	2.88
Mules.....	43 head.....	22	7,920	173	2.25
Hogs.....	46,144 head.....	4,614	692,100	168	1.67
Sheep.....	4,359 head.....	163	19,560	60	4.45
Manufactured articles:					
Fertilizer.....	.....	3,524	88,100	117	1.62
Machinery.....	.....	253	25,300	163	2.42
Lime and cement.....	2,043 barrels.....	328	2,788	212	1.04
General merchandise.....	.....	15,734	1,180,050	203	2.33
Coal.....	.....	98	196	141	1.41
Sand and gravel.....	87,805 cubic yards.....	181,707	52,683	9	(¹) 4.00
Shells.....	.....	165	1,320	50	4.00
Miscellaneous.....	.....	79	7,900	166	.88
Total.....		266,639	4,317,061	63	.96

¹ Transported by owners.

The following table gives a comparative statement of the commerce for the calendar years indicated:

Comparative statement.

Year.	Tonnage as reported in annual reports of Chief of Engineers (totals).	Farm products.	Forest products, exclusive of those transported by rafts.	Merchandise, including flour and meal.	Fertilizer.	Sand and gravel.	Miscellaneous, including coal, cement, iron and machinery, etc.	Totals, exclusive of sand, gravel, and rafted products.
1906.....	324,351	24,067	225,128	13,905	.....	42,930	3,301	266,421
1907.....	241,571	29,577	121,638	15,433	3,500	51,788	285	183,689
1908.....	246,260	14,594	145,228	17,827	.....	59,092	1,579	179,228
1909.....	225,074	18,019	103,813	29,422	500	68,250	3,070	154,824
1910.....	188,067	14,997	66,002	19,263	9,310	57,517	3,431	113,603
1911.....	181,029	24,314	37,007	13,217	2,688	75,709	590	77,816
1912.....	309,705	22,706	109,588	30,045	2,148	74,064	1,135	165,622
1913.....	337,824	16,318	78,774	19,171	4,024	103,206	2,272	120,539
1914.....	314,028	16,037	75,619	18,391	4,386	100,925	1,677	116,110
1915.....	266,186	17,088	68,623	15,734	3,524	121,707	933	95,902

(B) BELOW NASHVILLE.

River conditions have been very unfavorable for low-water work during the fiscal year, causing great inconvenience and delay to the work of the contractors as well as that undertaken by the United States with hired-labor forces. From July to November, inclusive, the usual low-water season, there were five or six rises ranging from 16 to 44 feet in height, and within this time there were only three short periods of 8 or 10 days' duration when the river gauge was less than 5 feet in height. For this reason the work of constructing the dams at Locks B and D was not undertaken and the completion of other important work was delayed.

MAINTENANCE.

The snagging party removed 215 large and 384 small snags, cut 61 trees, and trimmed 60 trees, covering and clearing the river from Lock No. 1 to the mouth, 190 miles. The work was done by hired labor with the use of snag boat *No. 1* and gasoline tender *No. 1*. The total cost of the snagging operations for the year was \$1,434.05. The work of cutting trees standing along the banks within the pool areas above Dams B, C, and D was completed. This work was done by hired labor at a cost of \$1,855.30.

LOCKS AND DAMS.

The contract for the construction of the lock and guide walls at Lock B (52 miles below Nashville) was 97 per cent completed at the beginning of the fiscal year, the only work remaining being the placing of a few irons, a small amount of excavation and embankment, the removal of the cofferdams, and the application of a wash coat of neat cement grout to the lock walls. All this work was completed during the year. The contract for the construction of the abutment at Lock B, which includes the necessary bank protection on the abutment side, was 82 per cent completed at the beginning of the fiscal year, the percentages of completion of the different items of the contract being: Earth excavation, 80 per cent; rock excavation, 90 per cent; concrete, 83 per cent; embankment, 66 per cent; puddling, 69 per cent; riprap, 55 per cent; stone filling, 48 per cent; and test holes, 91 per cent. All of this work was completed during the fiscal year, and the contract was closed and terminated on January 27.

The contract for the construction of the concrete lock and guide walls at Lock C (83 miles below Nashville) was 59 per cent completed at the beginning of the fiscal year, the inspectors' house and cofferdam being completed, the upper guide wall and the river wall of the lock practically completed, and a large part of the excavation having been finished. During the fiscal year the river wall was completed, the excavation was practically completed, one 35-foot block of the land wall was finished, and two 30-foot blocks were started, one 30-foot block of the lower guide wall was completed and another was about three-fourths completed, making the land wall 50 per cent completed and the lower guide wall 30 per cent completed. At the end of the fiscal year the entire contract was 70 per cent completed. The contract for the construction of the abutment at Lock C and the bank protection on the abutment side had been completed prior to the fiscal year.

Under the contract for the construction of the concrete lock and guide and guard walls at Lock D (104.4 miles below Nashville), all concrete work had been completed at the beginning of the fiscal year, the embankment behind the lock and upper guide walls had been completed, and the lower approach had been excavated to an average elevation of $1\frac{1}{2}$ feet above the lower miter sill. During the fiscal year about three-fourths of the embankment behind the lower guide wall was completed. The entire contract was 95.3 per cent completed at the end of the year.

A contract was entered into in the previous fiscal year for the completion of all work at Lock D not provided for in the contract

for the construction of the lock. It includes the construction of the abutment, the back fill behind the abutment, and the riprap protection thereof, the grading and protection of the river banks above and below the abutment and below the lock, the paving of the terreplein back of the lock and guide walls, the construction of the dam, the construction and installation of the steel lock gates, and other miscellaneous work. At the beginning of the fiscal year the lock gates had been partially erected, but alterations were found necessary to make them fit properly. The paving behind the lock and upper guide wall was completed, and the percentages of completion of other parts of the work were as follows: Concrete in the abutment, 80 per cent; back fill behind abutment, 8 per cent; and random riprap, 4 per cent. At the beginning of the fiscal year the entire contract was 29 per cent completed. During the fiscal year all work on the abutment side was practically completed, with the exception of a small amount of grading and embankment on the bank back of the hand-placed riprap. The excavation of the foundation and preparation of the timber for the dam had been completed. The shoes on the upper gates were adjusted so that the gates would fit properly, and some additional riveting was done; about 20 per cent of the concrete paving back of the lower guide wall was completed; and all other bank protection on the lock side was completed, with the exception of about 340 square yards of hand-placed riprap back of the lower guide wall. At the end of the fiscal year the entire contract was 62 per cent completed. The following tables show the amounts of each class of work done during the fiscal year and the total to the end of the year under the different contracts and the costs at the contract unit prices:

Contract for construction of Locks B and C.

LOCK B (COMPLETED).

	During year.		Total to date.	
	Quantity.	Cost.	Quantity.	Cost.
Earth excavation.....cubic yards..	3,045	\$2,436.00	157,213	\$45,770.46
Rock excavation.....do.....			3,961	7,922.00
Embankment.....do.....	3,235	549.95	113,426	2,282.25
Concrete.....do.....			125,868	150,034.40
Puddling.....do.....			791	1,582.00
Cofferdam.....linear feet.....			666.5	16,019.50
Bolt holes.....do.....			1,091.5	1,091.50
Handling and placing iron.....pounds.....	10,050	201.00	123,584	4,531.66
Inspectors' house.....number.....			1	1,500.00
Total cost.....		3,186.95	(1)	230,733.73

LOCK C.

Earth excavation.....cubic yards..	20,780	\$16,624.00	49,185	\$39,348.00
Rock excavation.....do.....	244.7	499.40	1,400	2,800.00
Embankment.....do.....	75	12.75	1,135	192.95
Concrete.....do.....	4,911	28,458.80	23,307	135,180.60
Puddling.....do.....	70	140.00	70	140.00
Cofferdam.....linear feet.....			725	24,650.00
Bolt holes.....do.....	44	44.00	338.5	338.50
Handling and placing iron.....pounds.....	26,926	538.52	129,116	2,582.22
Inspectors' house.....number.....				1,500.00
Total cost.....		46,332.47		206,732.37

¹ When the final estimate was made it was found that the total quantity did not agree with the individual quantities reported from time to time, and the necessary corrections have been made in this total.

Contract for construction of abutments, etc., at Locks B and C.¹

LOCK B.

	During year.		Total to date.	
	Quantity.	Cost.	Quantity.	Cost.
Earth excavation.....cubic yards..	3,855	\$2,891.25	¹ 44,511	\$33,383.25
Rock excavation.....do.....	49	147.00	705	2,115.00
Embankment.....do.....	4,923	2,461.00	¹ 9,375	4,687.50
Concrete.....do.....	1,108	7,202.00	¹ 4,487	20,165.50
Puddling.....do.....	45	67.80	¹ 256	384.00
Test holes.....linear feet.....	35	35.00	456.75	456.75
Riprap.....cubic yards..	1,871	8,419.50	¹ 4,200	18,900.00
Stone filling.....do.....	1,894	4,682.00	¹ 3,280	9,840.00
Total cost.....		26,905.25		¹ 96,932.00

CONTRACT FOR CONSTRUCTION OF LOCK D.

Earth excavation.....cubic yards..			4,687	\$2,343.50
Rock excavation, inside cofferdam.....do.....			8,781.1	13,171.65
Rock excavation, outside cofferdam.....do.....			2,711.66	5,423.32
Backfill.....do.....	136	\$98.00	8,764.7	4,377.25
Puddling.....do.....	34	51.00	137.7	206.55
Concrete in lock.....do.....			12,311.9	104,498.44
Concrete in guard and guide walls.....do.....			4,352.8	34,169.48
Bolt holes.....linear feet.....			606.98	606.98
Cofferdam.....do.....			664	21,582.00
Handling and placing iron.....tons.....			73.44	2,203.20
Inspector's house.....number.....			1	2,000.00
Total cost.....		119.00		190,582.47

¹ All work under this contract at Lock C was completed prior to the fiscal year.² When the final estimate was made, it was found that the total quantity did not agree with the individual quantities reported from time to time, and the necessary correction has been made in this total.*Contract for construction of abutments, etc., at Lock D.*

	During year.		Total to date.	
	Quantity.	Cost.	Quantity.	Cost.
Earth excavation, walls.....cubic yards..	11,560.5	\$11,560.50	30,159.10	\$30,159.10
Earth excavation, grading banks.....do.....	9,307.1	6,980.34	15,679.00	11,759.29
Back fill.....do.....	17,211.3	10,326.77	17,840.90	10,704.54
Concrete.....do.....	600.8	4,205.60	3,133.40	21,933.80
Concrete paving.....square yards.....	224.0	504.00	3,042.68	6,846.03
Puddling.....cubic yards.....	219.9	439.80	341.70	683.40
Riprap, hand placed.....square yards.....	8,622.3	19,400.20	8,622.30	19,400.20
Riprap, random.....do.....	16,543.4	28,950.98	17,323.40	30,315.96
Stone filling.....cubic yards.....	277.2	415.80	277.20	415.80
Derrick stone.....do.....	1,167.0	2,917.50	1,269.00	3,147.50
Lumber in dam and apron.....M feet b. m.....	20.43	1,021.50	30.43	1,021.50
Lumber in abutment and cribs.....do.....	561.34	280.68	4,785.40	2,992.72
Round piles.....linear feet.....	966.14	724.60	7,263.44	5,440.10
Sheet piling.....do.....				
Steel crest plate.....do.....				
Steel lock gates, 60 per cent complete, at \$21,000.....			60 per cent.	12,600.00
Total cost.....		87,728.25		156,819.94

A contract was entered into in the previous fiscal year for the construction and erection of the steel lock gates at Locks B and C, and their fabrication was about 30 per cent completed at the beginning of the present fiscal year. During the fiscal year the fabricated material for all of the gates was delivered. At the end of the year the upper gates at Lock B had been erected, and the erection of the lower gates was about 50 per cent completed. The erection of the gates at

Lock C was not begun, as the construction of the lock was not sufficiently advanced.

An emergency contract was entered into in the previous fiscal year for furnishing and delivering long-leaf yellow pine lumber for Dams B and C. At the beginning of the present fiscal year 50 per cent of the lumber for Dam B and 25 per cent of that for Dam C had been delivered. The contract was completed during the year.

Hired labor work.—The construction of the guard wall, the timber crib dam, and the toe wall below the lock, the excavation of the approaches to the lock, the protection of the banks on the lock side, assistance to the contractor for the lock gates, and miscellaneous other work is being done at Locks B and C by hired labor. At Lock B a considerable amount of work was done prior to the fiscal year in the way of constructing temporary quarters, tram tracks, etc., receiving plant, and other materials, quarrying stone, etc. During the fiscal year the excavation for the dam was completed, the grading of the banks for riprap was practically completed, and the banks were protected with random riprap for a length of 400 feet, and with hand-placed riprap for an aggregate length of about 100 feet. The concrete work was begun and at the end of the year the concrete guard wall and concrete toe wall were 60 per cent and 40 per cent completed, respectively.

The principal hired labor work done at Lock C prior to the fiscal year was the construction of the temporary quarters. The work done during the fiscal year was as follows: The timber and metal work for the dam was received and unloaded; a quarry was opened and 13,490 cubic yards of stone were quarried for use in bank protection. tram tracks were constructed, and other plant installed, and 11,699 cubic yards of material were removed in grading the banks preparatory to placing riprap.

The costs of the hired labor work done at Locks B and C during the year are given in the following tabulation:

Lock B:

Preparatory work—

Purchase of plant.....	\$2,025.96	
Construction of temporary quarters.....	61.44	
Construction of tram tracks, installation of plant, etc.....	6,458.70	
Stripping quarry, 2,722 cubic yards, at \$0.635 per cubic yard.....	1,728.35	
Quarrying stone, 13,490.6 cubic yards, at \$1.328 per cubic yard.....	17,916.10	
		\$28,190.55

Dam—

Purchase of lumber.....	20,394.16	
Handling lumber.....	2,771.95	
Excavation, 9,290 cubic yards, at \$0.07 per cubic yard.....	650.92	
		23,817.03

Guard wall—

Forms for concrete.....	1,190.05	
Mixing and placing concrete, including cement and steel, 452.6 cubic yards concrete, at \$4.104 per cubic yard.....	1,857.41	
Digging sand and gravel, 639 cubic yards, at \$0.721 per cubic yard.....	460.99	
		3,508.45

Lock B—Continued.

Toe wall—

Digging sand and gravel, 757.5 cubic yards, at \$0.973 per cubic yard	\$737.24	
Back fill, 508 cubic yards, at \$0.559 per cubic yard	284.08	
Earth excavation, 3,231 cubic yards, at \$0.59 per cubic yard	1,906.11	
Rock excavation, 70 cubic yards, at \$3.771 per cubic yard	264.00	
Forms for concrete	310.28	
Mixing and placing concrete, including cement, 401 cubic yards, at \$4.60 per cubic yard	1,844.68	
		\$5,346.34

Bank protection—

Back fill, 500 cubic yards, at \$0.595 per cubic yard	297.37	
Grading banks, 11,699 cubic yards, at \$0.527 per cubic yard	6,163.66	
Placing random riprap, 3,408 cubic yards, at \$1.11 per cubic yard	3,784.55	
Placing hand-placed riprap, 536.8 cubic yards, at \$1.789 per cubic yard	960.88	
Placing stone filling, 350.7 cubic yards, at \$1.065 per cubic yard	373.62	
Placing windrow, 1,028.8 cubic yards, at \$0.091 per cubic yard	93.77	
		11,673.85

Erecting gates—

Building coffer and pumping pit	709.63	
Erecting and operating derricks, etc	494.82	
		1,204.45

Approach—

Excavation, 14,750 cubic yards at \$0.148 per cubic yard	2,178.02	
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Building mound—

Embankments, 6,394 cubic yards, at \$0.357 per cubic yard	2,282.18	
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Total	78,200.32	
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Lock C:

Preparatory work—

Purchase of plant	1,509.16	
Construction of temporary quarters	158.14	
Constructing of tram tracks, installation of plant, etc	2,247.28	
Stripping quarry, 8,150 cubic yards, at \$0.679 per cubic yard	5,535.10	
		9,449.68

Dam—

Purchase of lumber, 719,666 feet b. m.	25,811.45	
Handling lumber and iron	4,085.62	
Excavation, 940 cubic yards, at \$0.127 per cubic yard	118.85	
		29,965.92

Bank protection—

Windrow excavation, grading banks, lower approach, fill on banks, 8,424 cubic yards, at \$0.259 per cubic yard	2,182.43	
Quarrying stone for riprap, 2,600 cubic yards, at \$1.449 per cubic yard	3,767.26	
		5,949.69

Erecting gates—

Handling	147.18	
Anchor rings	66.55	

Total	45,579.02	
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Additional surveying was done at Locks E and F during the year for the purpose of obtaining more complete data on which to base the design and estimates for these locks. Comparative estimates finished during the year indicated the desirability of constructing Lock F at the town of Eddyville, Ky., instead of at the site purchased about $1\frac{1}{2}$ miles above Eddyville, and investigations of the titles of the land required at the new site were under way at the end of the year. All lands that will be subject to claims for damage on account of back-water from Dams B, C, and D were surveyed and mapped, and the acreage of the different owners was computed.

Summary of expenditures below Nashville, Tenn.

Contract work:

Lock B—		
Superintendence and inspection.....	\$2, 553. 13	
Office and miscellaneous.....	989. 31	
Contract payments.....	71, 982. 33	
		\$75, 524. 77
Lock C—		
Superintendence and inspection.....	4, 782. 69	
Office and miscellaneous.....	957. 56	
Contract payments.....	61, 890. 54	
		67, 630. 79
Lock D—		
Superintendence and inspection.....	5, 369. 83	
Office and miscellaneous.....	772. 88	
Contract payments.....	92, 194. 56	
		98, 337. 27

Hired-labor work:

Lock B	86, 281. 08
Lock C.....	46, 397. 52
Lock D.....	356. 81
Lock E.....	316. 49
Lock F.....	463. 12
Survey party (ascertaining damage from overflow).....	2, 890. 25
Maintenance	4, 175. 37
Total	382, 363. 47

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 438).....	¹ \$460, 000. 00
Present project:	
July 13, 1892.....	\$40, 000
Aug. 18, 1894.....	30, 000
June 8, 1896.....	80, 000
Mar. 3, 1899.....	100, 000
June 13, 1902 (amended).....	180, 000
Mar. 3, 1905.....	10, 000
Mar. 3, 1909 (maintenance) allotted Apr. 1, 1909.....	10, 000
June 25, 1910 (locks and dams).....	213, 000
June 25, 1910 (maintenance).....	10, 000
Mar. 4, 1911 (locks and dams).....	250, 000
July 25, 1912 (maintenance).....	5, 000
July 25, 1912 (locks and dams).....	300, 000
Mar. 4, 1913 (maintenance).....	5, 000
June 23, 1913 (locks and dams).....	200, 000

¹ Including \$155,000 appropriated for Cumberland River, Tenn. and Ky., all of which was expended below Nashville.

RIVERS AND HARBORS—NASHVILLE, TENN., DISTRICT. 2699

Present project—Continued.

Oct. 2, 1914 (allotment dated Oct. 7, 1914).....	\$210, 000	
Mar. 4, 1915 (allotment dated Apr. 2, 1915).....	¹ 378, 000	
July 27, 1916.....	705, 000	
		\$2, 726, 000. 00
Total of appropriations.....		3, 186, 000. 00
Amount returned to surplus fund.....		1, 732. 18
Net total.....		3, 184, 267. 87
Received from sales (present project).....	\$987. 40	
Cash deposit taken up, pay due sundry persons, un- called for (present project).....	3. 15	
		990. 55
Total receipts from all sources.....		² 3, 185, 258. 42

CONTRACTS IN FORCE.

For building concrete Locks B and C (separate contract for each lock).

[Contractors: Mansfield Engineering Co.]

Character of work.	Lock B.		Lock C.	
	Amount of work.	Unit price.	Amount of work.	Unit price.
Earth excavation.....cubic yards..	52, 000	\$0. 80	58, 000	\$0. 80
Rock excavation.....do.....	1, 000	2. 00	1, 000	2. 00
Embankment.....do.....	30, 000	. 17	30, 000	. 17
Concrete.....do.....	25, 000	5. 80	33, 000	5. 80
Puddling.....do.....	1, 500	2. 00	1, 500	2. 00
Cofferdam.....linear feet..	600	23. 00	600	24. 00
Bolt holes.....do.....	300	1. 00	300	1. 00
Handling and placing irons.....pounds..	84, 610	. 02	84, 610	. 02
House (complete).....number..	1	1, 500. 00	1	1, 500. 00

	Lock B.	Lock C.
Date of contract.....	Apr. 8, 1912	Apr. 8, 1912
Date of approval.....	Apr. 24, 1912	Apr. 24, 1912
Date of beginning work.....	June 1, 1912	June 1, 1912
Date of expiration.....	Apr. 30, 1915	Apr. 30, 1915
Time limit extended by E. D. 810487.....	Oct. 15, 1915	Nov. 30, 1915
Percentage complete, June 30, 1916.....	100	70

For building concrete Lock D.

[Contractors: Foster-Creighton-Gould Co., Nashville, Tenn.]

Character of work.	Amount of work.	Unit price.
Cofferdam.....linear feet..	650	\$33. 00
Earth excavation.....cubic yards..	4, 000	. 60
Rock excavation, inside cofferdam.....do.....	2, 900	1. 50
Rock excavation, outside cofferdam.....do.....	6, 900	2. 00
Backfill.....do.....	9, 000	. 60
Puddling.....do.....	500	1. 50
Concrete, in lock.....do.....	12, 100	7. 85
Concrete, in guard and guide walls.....do.....	4, 500	7. 85
Bolt holes.....linear feet..	300	1. 00
Handling and placing iron and steel work.....tons..	62	30. 00
House (complete).....number..	1	2, 000. 00

¹ Includes \$40,000 transferred from "Above Nashville."

² Exclusive of a reimbursement of overpayment amounting to \$12.25 included in reports prior to 1915.

2700 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Date of contract: February 25, 1913.
 Date of approval: March 1, 1913.
 Date of beginning work: April 5, 1913.
 Date of expiration: March 5, 1916.
 Time limit waived by E. D. 86698/36, March 1, 1916.
 Percentage complete June 30, 1916: 95.3.

For building concrete abutments, etc., Locks B and C.

[Contractors: Mason & Hanger Co.]

Character of work.	Lock B.		Lock C.	
	Amount of work.	Unit price.	Amount of work.	Unit price.
Earth excavation.....cubic yards..	35,000	\$0.75	18,000	\$0.75
Rock excavation.....do.....	100	3.00	100	3.00
Embankment.....do.....	4,400	.50	3,000	.50
Concrete.....do.....	4,060	6.50	1,800	6.50
Puddling.....do.....	100	1.50	100	1.50
Test holes.....linear feet.....	50	1.00	50	1.00
Riprap.....cubic yards.....	3,360	4.50	4,600	3.00
Stone filling.....do.....	2,680	3.00	3,500	1.00

Date of contract: March 16, 1914.
 Date of approval: April 8, 1914.
 Date of beginning work: March 27, 1914.
 Date of expiration: May 19, 1915.
 Time limit waived by E. D. 92459/29, May 3, 1915.
 Contract closed and terminated: January 27, 1916.

For building steel hull, stern-wheel towboat "Warlotto."

Contractors: Dubuque Boat & Boiler Works.
 Date of contract: June 25, 1914.
 Date of approval: July 6, 1914.
 Date of beginning work: August 17, 1914.
 Date of expiration: February 12, 1915.
 Amount of contract: \$36,525.
 Contract closed and terminated: August 9, 1915.

For building dam, abutment, etc., Lock D.

[Contractors: Mason & Hanger Co.]

Character of work.	Amount of work.	Unit price.
Earth excavation, walls.....cubic yards..	\$2,600	\$1.00
Earth excavation, grading banks.....do.....	5,550	.75
Backfill.....do.....	7,500	.60
Concrete.....do.....	3,000	7.00
Concrete paving.....square yards.....	2,870	2.25
Puddling.....cubic yards.....	350	2.00
Riprap, hand placed.....square yards.....	11,750	2.25
Riprap, random.....do.....	18,400	1.75
Stone filling.....cubic yards.....	14,200	1.50
Derrick stone.....do.....	3,800	2.50
Lumber in dam and apron.....M feet b. m.....	712	60.00
Lumber in abutment cribs.....do.....	18	50.00
Round piles.....linear feet.....	6,000	.50
Sheet piling.....do.....	13,400	.75
Steel crest plate.....do.....	444	1.50
Steel lock gates (complete).....lot.....	1	21,000.00

Date of contract: October 10, 1914.
 Date of approval: October 28, 1914.
 Date of beginning work: November 14, 1914.
 Date of expiration: November 3, 1916.
 Percentage complete June 30, 1916: 62.

For construction and erection of steel lock gates for Locks B and C.

Contractor: Penn Bridge Co.
 Amount of contract: \$23,540.
 Date of contract: April 17, 1915.
 Date of approval: May 10, 1915.
 Date of beginning work: May 27, 1915.
 Date of expiration, Lock B: September 15, 1915.
 Date of expiration, Lock C: Six weeks after notification that the masonry of the lock is ready for the installation of the gates.
 Time limit waived by E. D. 96423/29, July 22, 1915.
 Percentage complete June 30, 1916: Lock B, 75 per cent; Lock C, 75 per cent.

EMERGENCY CONTRACTS.

For furnishing and delivering sluice-gate operating machinery, Locks B and C.

Contractor: H. P. Gazzam Machine Co.
 Amount of contract: \$3,025.
 Date of contract: February 23, 1915.
 Date of beginning: Not given.
 Date of expiration: June 3, 1915.
 Time limit waived by E. D. 96316/22, May 24, 1915.
 Contract closed and terminated: Lock B, July 31, 1915; Lock C, July 26, 1915.

For furnishing and delivering long-leaf yellow-pine lumber for Dams B and C.

Contractor: McLeod Lumber Co.
 Amount of contract: \$44,453.30.
 Date of contract: April 27, 1915.
 Date of beginning work: May 20, 1915.
 Date of expiration: Lock B, July 1, 1915.
 Date of expiration: Lock C, September 1, 1915.
 Time limit waived by E. D. 96943/31, June 28, 1915.
 Contract closed and terminated: Lock B, August 31, 1915; Lock C, November 4, 1915.

COMMERCIAL STATISTICS:

[Cumberland River below Nashville, Tenn., from Jan. 1 to Dec. 31, 1915.]

Season of navigation: Open beginning of year; closed in August, 1915.

Vessel classification.

Registered steamers (American).....	19
Net registered tonnage	1, 208
Passengers	14, 251

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Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Rate per ton-mile.
Forest products:				<i>Miles.</i>	<i>Cents.</i>
Logs.....	2,521,497 feet b. m.....	6,964	\$69,640	71	1.83
Lumber.....	1,085,903 feet b. m.....	2,172	43,440	89	1.66
Spokes.....	260,571.....	521	10,420	30	(^c)
Staves and bolts.....	25,210.....	50	1,200	125	.56
Railroad ties.....	978,893.....	85,651	428,255	155	4.58
Farm products:					
Chickens.....	24,786 coops.....	1,487	594,800	55	2.53
Hay.....	3,800 bales.....	190	4,750	35	2.47
Produce.....	.....	265	21,300	107	2.76
Corn.....	183,100 bushels.....	5,127	138,429	205	.85
Wheat.....	40,620 bushels.....	1,219	53,636	200	.59
Live stock—					
Cattle.....	396 head.....	198	23,780	75	5.22
Horses.....	173 head.....	87	31,320	79	6.43
Mules.....	220 head.....	110	39,600	75	6.65
Hogs.....	2,696 head.....	270	40,500	84	4.09
Tobacco.....	1,727 hogheads.....	1,295	310,800	39	4.78
Manufactured articles:					
Lime and cement.....	586 barrels.....	80	788	102	1.97
Machinery.....	.....	312	31,200	97	5.05
Fertilizer.....	.....	421	10,525	129	2.41
Scrap iron.....	.....	325	3,700	55	1.92
General merchandise.....	.....	3,904	292,800	86	1.27
Coal.....	.....	200	400	100	1.20
Sand and gravel.....	10,158 cubic yards.....	15,237	6,095	8	(^c)
Oil.....	1,850 barrels.....	464	11,600	45	4.44
Mussel shells.....	.....	400	3,200	100	4.00
Total.....		126,949	2,172,058	127	- .83

¹ 2,633 tons rafted.² Transported by owners.³ 41,967 tons transported by owners.

The following table gives a comparative statement of the commerce for the calendar years indicated:

Comparative statement.

Year.	Tonnage as reported in annual reports of Chief of Engineers (total).	Farm products.	Forest products, exclusive of those transported by rafts.	Merchandise, including flour and meal.	Fertilizer.	Sand and gravel.	Miscellaneous, including coal, cement, iron, machinery, etc.	Totals, exclusive of sand, gravel, and rafted products.
1906.....	223,899	20,185	159,346	2,000	.....	31,680	.....	190,531
1907.....	300,810	40,928	227,189	20,600	1,500	1,800	2,850	293,067
1908.....	259,794	24,176	217,272	6,300	.....	8,520	1,778	249,526
1909.....	193,118	27,202	129,468	18,113	82	16,414	1,777	175,043
1910.....	327,757	56,365	168,909	42,513	.....	45,000	9,770	277,557
1911.....	223,278	23,264	145,334	7,159	700	40,916	2,305	178,793
1912.....	176,659	21,431	59,373	10,800	.....	26,780	1,542	93,146
1913.....	165,123	16,123	131,024	3,705	1,100	11,250	1,026	153,973
1914.....	153,458	6,151	99,266	4,140	851	38,976	1,337	111,745
1915.....	126,949	10,250	92,728	3,904	421	15,237	1,781	108,079

2. OPERATING AND CARE OF LOCKS AND DAMS ON CUMBERLAND RIVER.

The usual work of operating the locks, maintaining the channels in the pools, and caring for the locks, buildings and grounds, and other property was carried on during the year. All work was done by hired labor, with the use at different times of the steamers *Warioto*, *John*, and *Henry*, the dredge *Sevier*, barges, derrick boats, and other plant belonging to the Cumberland River improvement.

Locks and dams.—New timber miter posts were framed for the upper gates at Locks A, 1, and 5 and installed at Lock 5. A fishway was installed at Dam No. 7, and preparations were made for their

installation at Dams Nos. 3 and 5. Silt was dredged from the lock chambers at Lock A and Locks Nos. 1 to 7, inclusive. The lock gates were painted at Locks Nos. 2, 3, 5, and 21. Concrete gauges were constructed at each end of Lock 5 from the top of lock walls to top of banks. A well was bored at Lock 3 and sewer pipe laid. Four tread planks on the gates at Lock 5 were renewed.

Houses and grounds.—The lockmen's houses were painted at Locks Nos. 1, 2, 5, 6, and 7. Minor repairs were made to the buildings and grounds at all of the locks. The tram track on abutment side at Lock 4 was removed from the old quarry back to the United States property line, the rails being piled on the river bank. Scrap iron and brass aggregating 25½ tons in weight were collected and sold at Nashville, the amount received, \$463.09, being turned into the Treasury.

Pools.—The channel was dredged at Upper Nashville Island, 4,700 cubic yards of loose material being removed at a cost of \$487, or 10.4 cents per cubic yard.

Construction and repair of plant.—Lock A has been used as headquarters for the construction and repair of floating plant and for the repair and storage of machinery, derricks, and other plant, as well as for the reception of a large part of the materials used in the construction of Locks B and C. During the year dump scows *No. 5* and *No. 6* and Dock No. 2 were constructed at costs of \$2,543, \$2,862, and \$660, respectively, and paid for out of funds for operating and care. Of the total cost of the steamer *Warioto*, which was constructed prior to the fiscal year, \$6,778.10 was paid out of funds for operating and care during the year. Floating-plant repairs were made during the year and charged to operating and care, as follows: Steamer *John*, \$1,586.61; steamer *Warioto*, \$424.18; derrick boat *No. 3*, \$199.01; quarter boat *No. 2*, \$167.29; dredge *Sevier*, \$71.57; launches, \$129.43. The machinery of the steamer *Cumberland* was dismantled and minor repairs were made to the hull at a cost of \$337.59.

Reimbursable.—Expenditures on account of the Isthmian Canal Commission were made during the year to the amount of \$6.60, of which \$3.30 was reimbursed during the year, leaving a balance of \$3.30 reimbursable at the end of the fiscal year.

SUMMARY OF COST OF OPERATING AND CARE FOR THE FISCAL YEAR.

Services of lock force	\$10, 651. 27
Dredging	2, 173. 66
Repairs to lock gates, operating machinery, buildings and grounds	5, 625. 48
Floating plant	8, 980. 63
Office and miscellaneous	8, 828. 45
Fishways	1, 460. 89
Total	37, 720. 38

EXPENDITURES.

1906	\$5, 601. 30	1913	\$129, 562. 88
1907	6, 950. 58	1914	162, 868. 59
1908	16, 623. 95	1915	103, 945. 94
1909	31, 801. 58	1916	47, 635. 59
1910	33, 055. 78		
1911	32, 508. 78	Total	669, 228. 54
1912	98, 673. 62		

CONTRACTS IN FORCE.

For abstract of contract for construction of the towboat *Warlike* see the report for the Cumberland River below Nashville.

COMMERCIAL STATISTICS.

Statement of traffic passing through locks on the Cumberland River during calendar year 1915.

	Lock A.	Lock 1.	Lock 2.	Lock 3.
Total lockages.....	798	1,074	1,001	622
Craft:				
Packets.....	184	206	261	219
Towboats.....	165	160	223	125
Government boats.....	194	47	37	41
Barges.....	287	923	480	288
Sand dredgers.....	2	423	84	.....
Small craft.....	212	173	323	155
Rafts.....	15	122	179	179
Cargo:				
Farm products—				
Tobacco..... short tons.....	.....	279	1,341	1,343
Grain..... do.....	8,349	8,781	8,201	8,532
Live stock—				
Large..... do.....	391	429	652	598
Small..... do.....	550	734	3,255	3,318
Other farm products..... do.....	287	346	2,352	2,717
Forest products—				
Handles and slabs..... do.....	.....	.....	183	167
Hoops..... do.....	.....	.....	292	339
Logs..... do.....	946	15,300	21,132	23,305
Lumber..... do.....	1,732	1,456	4,062	4,127
Posts..... do.....	.....	.....	1,661	2,089
Railroad ties..... do.....	32,962	17,408	11,977	15,523
Spokes..... do.....	.....	120	758	808
Other timber products..... do.....	44	429	2,163	1,499
Fertilizer..... do.....	100	291	2,664	2,798
General merchandise..... do.....	7,305	6,403	13,065	13,038
Sand and gravel..... do.....	.....	63,372	22,961	.....
Coal..... do.....	.....	1,200	140	100
Miscellaneous..... do.....	941	1,053	628	546
Total..... do.....	53,507	117,561	97,448	81,719
Passengers.....	4,235	5,925	12,584	6,026

	Lock 4.	Lock 5.	Lock 6.	Lock 7.	Lock 21.
Total lockages.....	581	580	572	596	475
Craft:					
Packets.....	221	219	223	223	314
Towboats.....	118	107	109	116	172
Government boats.....	42	42	60	21	5
Barges.....	257	263	270	225	490
Small craft.....	51	92	82	97	54
Rafts.....	166	176	162	165	2
Cargo:					
Farm products—					
Tobacco..... short tons.....	1,368	1,370	1,356	916	160
Grain..... do.....	8,334	8,310	8,626	5,582	744
Live stock—					
Large..... do.....	630	726	537	491	823
Small..... do.....	3,625	3,261	2,878	2,418	1,806
Other farm products..... do.....	2,582	2,412	2,444	2,177	597
Forest products—					
Handles and slabs..... do.....	181	193	139	174	.....
Hoops..... do.....	330	330	320	149	.....
Logs..... do.....	22,320	22,618	22,123	21,290	3,045
Lumber..... do.....	4,262	3,822	4,175	4,072	6,265
Posts..... do.....	1,943	1,441	1,476	803	.....
Railroad ties..... do.....	15,077	16,120	16,961	15,245	394
Spokes..... do.....	806	808	808	856	.....
Other timber products..... do.....	1,441	1,351	1,246	1,430	3,671
Fertilizer..... do.....	2,999	2,979	2,815	2,585	2,493
General merchandise..... do.....	12,713	11,818	11,948	10,890	5,794
Coal..... do.....	190	190	190	190	114
Miscellaneous..... do.....	491	396	325	208	1,647
Total..... do.....	79,294	78,166	77,356	69,639	27,563
Passengers.....	5,446	4,905	4,980	4,211	3,280

IMPROVEMENT OF RIVERS AND HARBORS IN THE CHATTANOOGA, TENN., DISTRICT.

REPORT OF MAJ. H. BURGESS, CORPS OF ENGINEERS.

IMPROVEMENTS.

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1. Tennessee River above Chattanooga.....	2705	2. Tennessee River, Chattanooga to Riverton—Continued.	
2. Tennessee River, Chattanooga to Riverton:		(e) Operating and care of Colbert Shoals Canal (head of Colbert Shoals to Riverton).....	2723
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(b) Hales Bar to Browns Island.....	2713	4. French Broad and Little Pigeon Rivers, Tenn.....	2729
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(d) Florence to Colbert Shoals.....	2720		

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 1172 TO 1202.

NOTE.—Quantities as given in the report, whether for excavated rock or gravel, for quarried rock, or for rock used in dikes, are for "place measurement"; that is, they represent in each case the space occupied by the material in situ. For estimated quantities of excavation, an allowance of 1 foot "overcut" is made. All overhead charges, including plant repairs and depreciation, have been prorated into the different items of open-channel work.

1. TENNESSEE RIVER ABOVE CHATTANOOGA.

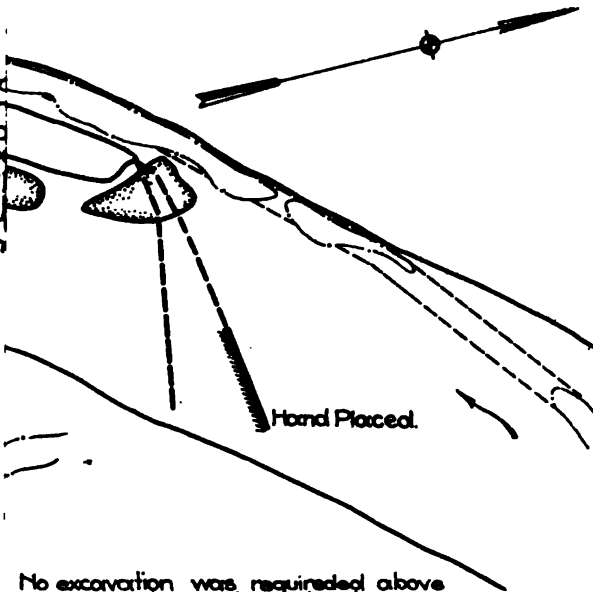
Operation of floating plant.—Open-channel work was carried on with the two parties, Nos. 1 and 2, which belong to this section of the river. Party No. 1 worked at Soddy, Dallas, Williams, Lyons, and Chota Shoals, and was equipped throughout the year with the dredge *Tellico*, steamer *Chilhowee*, 4 derrick boats, 3 dump scows, 8 barges, 1 tool boat, 1 launch, and 2 quarter boats. In addition, the steamer *Chickamauga* was used for 9 months and 3 new drill rafts for 4 months. Party No. 2 worked at Goodfield, Washington-Hazleridge, and Sale Creek Shoals, and was equipped for the greater part of the year with the dredges *Nolichucky* and *Kwasind*, steamers *Ocoee* and *Hiwassee*, 2 derrick boats, 6 dump scows, 12 barges, 1 tool boat, 2 launches, 5 quarter boats, 1 drill raft, 1 drill tender, and 1 drill boat.

Soddy Shoals (23 miles above Chattanooga).—For description of this obstruction and the work done prior to the fiscal year, see Annual Report for 1915, page 2857. The improvement was 95 per cent completed at the beginning of the fiscal year, and all additional work was finished on November 5, the period worked during the year aggregating about 17 days. During this period, 110 holes, aggregating 425 linear feet in depth and spaced 5 by 7 feet apart over an area of 5,010 square feet, were drilled and blasted, at a cost of \$984.07, or \$2.31 per linear foot. Blasted rock amounting to 500 cubic yards was excavated, at a cost of \$1,177.54, or \$2.35 per cubic yard, and this rock was placed in 150 linear feet of dike, at a cost of \$608.13, or \$0.122 per cubic yard. About 2,000 linear feet of dredged channel, 150 feet wide, was cleared of all materials lying above grade, at a cost of \$251.79, or \$0.126 per linear foot of channel cleared. The costs given include charges for depreciation of plant amounting to \$365.16.

Dallas Shoals (16 miles above Chattanooga).—For description of this obstruction and the work done prior to the fiscal year, see Annual Report for 1915, page 2858. The improvement was 10 per cent completed at the beginning of the year, and operations were continued during the year from July 6 to October 23, when all additional work was completed. During the year 227 holes, aggregating 1,055 linear feet in depth and spaced 5 by 8 feet over an area of 19,175 square feet, were drilled and blasted, at a cost of \$2,398.32, or \$2.27 per linear foot. Gravel amounting to 16,626 cubic yards was excavated, at a cost of \$8,963.46, or \$0.539 per cubic yard. Shale amounting to 11,937 cubic yards was excavated, at a cost of \$16,890.96, or \$1.42 per cubic yard. Rock amounting to 500 cubic yards was excavated, at a cost of \$709.57, or \$1.42 per cubic yard. Additional material amounting to 500 cubic yards of excavated rock and 70 cubic yards of quarried rock was placed in the closing dike at the head of Dallas Island, at a cost of \$1,415.70 for handling and placing, or \$2.48 per cubic yard. The other dikes required were constructed by dumping or casting the excavated material, the cost of which is included in the cost of excavation. The entire dredged channel, 2,850 feet long and 150 feet wide, was gone over and cleared of all material lying above grade, at a cost of \$1,210.39, or \$0.425 per linear foot of channel cleaned. The costs given include charges for depreciation of plant amounting to \$5,020.

Williams Shoals (174 miles above Chattanooga).—The approved plan of improvement at this locality provides for the construction of 5,400 linear feet of dike, containing 4,000 cubic yards of excavated stone and 6,500 cubic yards of quarried stone, and for the excavation of 4,750 cubic yards of rock and 22,500 cubic yards of gravel, at a total estimated cost of \$31,800. No work had been done here prior to the fiscal year. The dredge *Tellico* began operations on October 8, and was jointed by the rest of the fleet belonging to party No. 1 on November 23. Active operations progressed with slight delays due to high water until February 29, when all plant was moved to Lyons Shoals. Work was resumed with a small force and a portion of the plant on April 17 and continued until June 8, when the low condition of funds necessitated a reduction in the force, a complete suspension being ordered on June 17. During the year 1,553 holes, aggregating 8,148 linear feet in depth and spaced 5 by

Cont
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No excavation was required above
Soddy Creek due to contraction.

QUANTITIES.

	Estimated	Actual.
n.	12,200 cu.yds.	17,599 cu.yds.
on.	71,500 - -	39,540 - -

TENNESSEE RIVER
ABOVE CHATTANOOGA
IMPROVEMENT OF SODDY SHOALS
IMPROVEMENT COMPLETED
Sheet. Sheet No. 1.

000 0 800 1600

near Office Nashville, Tenn., June 30, 1916.
Approved: *[Signature]*

Major Corps of Engineers.
accompany annual report for 1916.

7 feet over an area of 76,216 square feet, were drilled and blasted, at a cost of \$7,643.23, or \$0.938 per linear foot. Rock amounting to 1,350 cubic yards was excavated, at a cost of \$2,510.88, or \$1.86 per cubic yard. Gravel amounting to 37,418 cubic yards was excavated, at a cost of \$21,003.58, or \$0.561 per cubic yard. Dikes aggregating 1,151 linear feet in length were constructed, with 1,185 cubic yards of excavated stone and 825 cubic yards of quarried stone, at a cost of \$5,716.10 for handling and placing, or \$2.85 per cubic yard. The stone quarried amounted to 1,279 cubic yards and cost \$1,994.04, or \$1.56 per cubic yard. The costs given include charges for depreciation of plant, amounting to \$5,413. At the end of the year the degree of completion was 55 per cent for drilling and blasting, 75 per cent for excavation, 30 per cent for dike construction, and 50 per cent for the entire improvement.

Lyons Shoals (176 miles above Chattanooga).—The approved plan of improvement at this locality provides for the construction of 4,410 linear feet of dikes, containing 10,500 cubic yards of quarried stone, and for the excavation of 27,500 cubic yards of gravel, at a total cost of \$25,200. No work had been done here prior to the fiscal year. The entire fleet of party No. 1 was engaged here from March 1 to April 17 when a small portion of the plant was transferred to Williams Shoals. Work was continued with the reduced plant until June 17, when operations were suspended on account of lack of funds. During the period worked 780 cubic yards of stone were quarried, at a cost of \$2,193.91, or \$2.81 per cubic yard; 4,360 cubic yards of shale were excavated, at a cost of \$5,094.59, or \$1.17 per cubic yard; 14,680 cubic yards of gravel were excavated, at a cost of \$9,325.84, or \$0.635 per cubic yard; and 500 linear feet of dike were constructed, with 645 cubic yards of quarried stone, at a cost of \$2,055.81 for the handling and placing, or \$3.19 per cubic yard. The costs given include charges for depreciation of plant amounting to \$2,891. At the end of the fiscal year the degree of completion was 50 per cent for the excavation, 7 per cent for the dike construction, and 35 per cent for the entire improvement.

Chota Shoals (148.5 miles above Chattanooga).—On November 18 and 19 one derrick from party No. 1 removed a small but obstructive bar at this locality, 175 cubic yards of gravel being excavated at a cost of \$52.70, or \$0.30 per cubic yard.

Goodfield Shoals (50 miles above Chattanooga).—For description of this obstruction and the work done prior to the fiscal year, see Annual Report for 1915, page 2856. The improvement was 85 per cent completed at the beginning of the fiscal year. All additional work contemplated by the approved plan of improvement was finished during the year, except the construction of about 1,300 linear feet of spur dike. It is not believed that the construction of the remaining dikes will be necessary, but this can not be determined until a survey is made. At the end of the year the entire approved plan was 90 per cent completed. During the fiscal year 20,285 cubic yards of mixed gravel, boulders, and loose rock were removed, at a cost of \$24,232.98, or \$1.20 per cubic yard. The remainder of the channel was cleaned of all material left above grade after the dredging, at a cost of \$5,234.53. While it was necessary to drill only 75 holes of an aggregate depth of 375 linear feet, the excavation of the material removed during the year was found difficult on account of

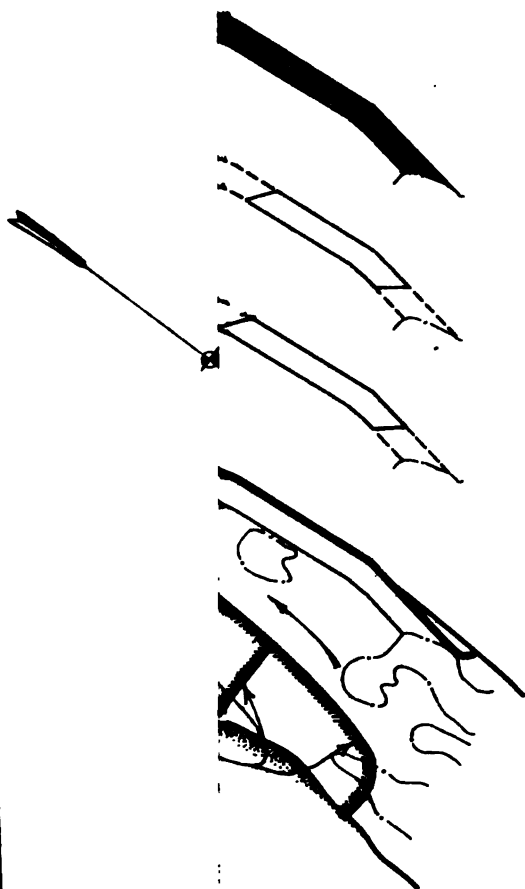
the rock and boulders. The costs given include charges for depreciation of plant amounting to \$4,284.69.

*Washington-Hazleridge Shoals (52.5 miles above Chattanooga).—*For description of this obstruction and the work done prior to the fiscal year, see Annual Report for 1915, page 2857. The improvement was 40 per cent completed at the beginning of the fiscal year. During the fiscal year the gravel excavation was completed, 34,780 cubic yards being removed, at a cost of \$17,315.80, or \$0.499 per cubic yard; 1,733 holes, of an aggregate depth of 10,307 linear feet were drilled and blasted over an area of 166,200 square feet, at a cost of \$10,623.61, or \$1.031 per linear foot; 11,469 cubic yards of blasted rock containing a small percentage of gravel were excavated, at a cost of \$8,935, or \$0.779 per cubic yard; channel-cleaning operations were carried on behind the dredging, the cost of this work being \$2,112.04; and 2,000 cubic yards of excavated material were towed and placed in dikes, at a cost of \$4,340.23, or \$2.17 per cubic yard. Other dikes were constructed during the year by casting or dumping excavated material, the cost being charged to excavation. The costs given include charges for depreciation of plant amounting to \$7,622. The entire improvement was 60 per cent completed at the end of the fiscal year.

*Sale Creek Shoals (31 miles above Chattanooga).—*The approved plan of improvement at this locality provides for the construction of dikes containing 1,200 cubic yards of rock excavated from the channel and 25,000 cubic yards of quarried rock, and for the excavation of 2,300 cubic yards of rock and 58,000 cubic yards of gravel, at a total estimated cost of \$70,000. After a winter lay-up of about one month, operations were begun at this obstruction on February 11. During the fiscal year gravel amounting to 53,665 cubic yards was removed, at a cost of \$19,621.14, or \$0.366 per cubic yard; 7,500 cubic yards of rock were quarried, at a cost of \$7,619.04, or \$1.016 per cubic yard; 6,800 cubic yards of quarried stone were placed in dikes, principally the one connecting the two islands, at a cost of \$5,301.22, or \$0.779 per cubic yard for handling and placing. Some of the work of clearing the channel of material left above grade by the dredges was done, at a cost of \$1,072.68. The costs given include depreciation of plant, amounting to \$6,223. At the end of the fiscal year the degree of completion was 75 per cent for the gravel excavation, 30 per cent for the dike work, and 40 per cent for the entire improvement.

Surveys.—Surveys were made at the following shoals at the costs given: Dallas, \$697; Goodfield, \$195; Half Moon Island, \$3,192; Looney Island, \$72; Loudon, \$746; North Chicamauga, \$2,233; Washington-Hazleridge, \$145; and Williams, \$133. Studies were made in connection with the improvement of Coulter Island Shoals, at a cost of \$150. Discharge measurements were made at Igou Ferry, at a cost of \$850.

Construction and repair of plant.—The boat yard at Chattanooga was used in the repair and construction of plant for the river above Chattanooga, as well as for receiving, storing, and distributing supplies. All costs incurred at the boat yard have been prorated into the repair and construction work done and into the open-river work carried on above Chattanooga. The principal construction work done at the boat yard during the year is shown in the following table:



TENNESSEE RIVER
 ABOVE CHATTANOOGA
 OF WASHINGTON-HAZELRIDGE SHOALS
 CONDITION JUNE 30, 1916.

Sheet No. 1.

0 800' 1600'
 Office Nashville, Tenn., June 30, 1916.
 Approved *[Signature]*

Major Corps of Engineers.
 Company annual report for 1916.

C. No. ; 64th Cong., 2d Sess.

Plant.	Class of work.	During year.	Total.
Dredge <i>Kwasind</i> —hull and cabin.....	Original construction.....	\$123. 15	\$8, 940. 00
Dredge <i>Kwasind</i> —machinery.....	do.....	1, 898. 63	9, 012. 00
Dump scow 4-R.....	do.....	1, 620. 63	2, 712. 37
Dump scow 6-R.....	do.....	1, 440. 05	2, 627. 76
Dump scow 14-R.....	do.....	2, 192. 00	2, 532. 47
Skiffs.....	do.....	298. 01	298. 01
Steamer <i>Chickamauga</i> —machinery.....	do.....	51. 68	3, 799. 68
Steamer <i>Chilhowee</i> —hull.....	Reconstruction.....	3, 256. 12	3, 256. 12
Steamer <i>Hiwassee</i> —hull.....	do.....	2, 195. 52	2, 195. 52
Derrick boat 8-R—hull.....	do.....	1, 182. 57	3, 583. 72
Derrick boat 8-R—machinery.....	do.....	1, 828. 50	828. 50
Derrick boat 7—hull.....	Extraordinary repairs.....	998. 89	998. 89
Barge 25-R.....	Original construction.....	2, 387. 75	2, 504. 86
Barge 26-R.....	do.....	2, 106. 04	2, 212. 62
Drill raft No. 32.....	do.....	85. 84	-----
Drill raft No. 33.....	do.....	64. 31	-----
Quarter boat 7.....	Reconstruction.....	747. 31	747. 35
Quarter boat 10.....	do.....	1, 157. 00	1, 157. 00
Total.....	-----	31, 637. 06	-----

¹ Includes purchase and installation of machinery.

² Includes charges for installation of machinery.

³ Purchase price.

Drill rafts *Nos. 29, 30, and 31* were constructed by party No. 1 while in the field, at a cost of \$200 each. A boiler was purchased for the dredge *Kwasind* during the fiscal year, at a cost of \$792.

Repairs were made to various pieces of plant at the boat yard and in the field, and a small amount of work was also done for this section at the Muscle Shoals shops. The cost of repairs made at the boat yard was \$4,493.52; in the field, \$13,406.20; and at Muscle Shoals, \$201.44; a total of \$18,101.16. The principal items of repair were dredge *Nolichucky*, \$4,850; dredge *Kwasind*, \$2,109; dredge *Tellico*, \$1,646; dump scow *No. 6*, \$648; dump scow *No. 8*, \$709; derrick boat *No. 6*, \$549; steamer *Hiwassee*, \$511; steamer *Ocoee*, \$485; derrick boat *No. 14*, \$430; steamer *Chilhowee*, \$437; derrick boat *No. 12*, \$406; barge *No. 53*, \$369; derrick boat *No. 11*, \$342; and derrick boat *No. 7*, \$285. A number of other pieces had repairs of less amounts. All repair costs were prorated into the different items of open-channel work.

The following is a summary of the cost of all operations in this section of the river during the year:

Open channel work:

Net field cost.....	\$124, 371. 12	
Repairs to plant.....	18, 101. 16	
Nashville office charges.....	4, 465. 19	
Caring for fleets while not working, and similar expenses.....	20, 200. 08	
Depreciation of plant.....	31, 818. 85	
		\$198, 956. 35
Construction and reconstruction of floating plant.....		33, 023. 69
Construction and purchase of other plant.....		8, 189. 09
Surveys, studies, etc.....		8, 412. 14
Total.....		248, 581. 27

Increase in project estimate.—The report on reexamination of the project for improving the Tennessee River, which contains an increase of \$1,205,000 in the project estimate for this section of the river, was approved by the Chief of Engineers (H. Doc. No. 981, 64th Cong., 1st sess.). This increase was necessitated principally by reason of the fact that the original estimate made insufficient

allowance for material necessarily removed below the grade line of the excavated cuts, for the cost of dike construction, and for flowage damages.

Reimbursable.—On July 1, 1915, \$42.99 was reimbursable. During the fiscal year \$425.54 additional was expended for various purposes, and \$219.37 was reimbursed, leaving a balance reimbursable on July 1, 1916, of \$249.16.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 563).....		\$866, 760. 37
Present project:		
(1) Caney Creek lock and dam—		
July 25, 1912.....	\$15, 000. 00	
Mar. 4, 1913.....	10, 614. 57	
		25, 614. 57
(2) Open-channel work—		
July 25, 1912.....	90, 000. 00	
Mar. 4, 1913.....	210, 000. 00	
Mar. 4, 1915 (allotment dated Apr. 1, 1915).....	150, 000. 00	
Mar. 4, 1915 (allotment dated June 2, 1916).....	14, 000. 00	
July 27, 1916.....	300, 000. 00	
Received by transfers from Caney Creek lock and dam.....	289, 385. 43	
		1, 053, 385. 43
Grand total of all appropriations.....		1, 945, 760. 37
Received from sales (previous project).....	170. 00	
Received from sales (present project).....	1, 166. 75	
		1, 336. 75
Receipts from all sources.....		1, 947, 097. 12

ABSTRACT OF CONTRACT.

Above Chattanooga.—Contract with the Marion Osgood Co., of Marion, Ohio, for furnishing and installing new machinery on dredge *Kwasind* for \$8,500; contract dated January 7, 1915; date of beginning work, February 16, 1915; date of expiration, May 17, 1915; contract was completed on time and closed and terminated on August 20, 1915.

COMMERCIAL STATISTICS.

TENNESSEE RIVER ABOVE CHATTANOOGA.

Season of navigation, calendar year 1915: Navigation was uninterrupted.

Vessel classification.

American registered steamers.....	19
Net registered tonnage.....	1, 068
Unregistered rafts.....	Not reported.

About 52 barges, with a total capacity estimated at 4,605 tons, were employed by the steamboats operating in this section.

¹ Exclusive of \$510.09 expended on Little Tennessee River in accordance with terms of act of Mar. 3, 1905.

² Exclusive of \$289,385.43 transferred to open-channel work by departmental authority.

³ Including \$3,219 transferred from appropriation for Clinch and Hiwassee Rivers, Tenn.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Average rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Brick.....	143,000.....	295	\$944	46	2.0
Cement.....	770 barrels.....	154	1,078	13	3.9
Coal.....	.....	640	1,280	9	2.1
Cotton.....	781 bales.....	195	46,800	82	4.6
Fertilizer.....	.....	765	19,150	60	3.0
Flour.....	2,243 barrels.....	224	11,200	39	4.8
Grain:					
Corn.....	455,906 bushels.....	12,795	344,655	51	1.8
Oats.....	27,448 bushels.....	412	12,772	64	1.8
Wheat.....	133,304 bushels.....	3,999	175,956	29	1.8
Rye.....	42 bushels.....	1	36	20	5.5
Hay.....	89,262 bales.....	4,464	111,600	42	2.6
Iron ore.....	.....	75,000	\$37,500	10	2.0
Live stock:					
Cattle.....	447 head.....	224	26,880	81	6.4
Hogs.....	1,175 head.....	118	17,700	46	6.1
Horses.....	303 head.....	152	54,720	65	9.2
Mules.....	50 head.....	25	9,000	65	9.2
Logs:					
Towed in barges.....	244,247 feet b. m.....	733	7,330	37	1.4
Rafted.....	8,410,907 feet b. m.....	25,232	252,320	.....	.....
Lumber:					
Towed in barges.....	6,306,650 feet b. m.....	12,435	248,700	54	1.1
Rafted.....	50,000 feet b. m.....	100	2,000	.....	.....
Machinery.....	.....	1,122	112,200	61	8.6
Marble.....	6,500 cubic yards.....	14,625	219,375	4	1.0
Merchandise, miscellaneous.....	.....	6,207	465,525	56	7.0
Poultry.....	681 coops.....	41	16,400	65	12.3
Produce, farm.....	.....	9,656	772,480	39	8.1
Sand and gravel.....	149,532 cubic yards.....	224,298	89,719	4	(¹) 1.9
Straw.....	19,135 bales.....	574	5,740	61	1.9
Ties, railroad.....	90,000.....	7,875	39,375	44	1.3
Wood.....	140 cords.....	280	560	21	2.3
Total.....	.....	402,622	3,408,995	12	3.0

¹ Transported by owners.

Number of passengers carried, 11,744.

The following is a comparative statement of commerce for a period of 10 years, compiled from the annual reports of the Chief of Engineers, U. S. Army. The unit of the table is the ton of 2,000 pounds.

Tennessee River above Chattanooga.

Year.	Tonnage as reported in annual reports of Chief of Engineers (total).	Farm products.	Forest products exclusive of those transported by rafts.	Iron ore.	Marble.	Merchandise, including flour and meal.	Fertilizer.	Miscellaneous, including coal, steel, cement, machinery, etc.	Total.
1906...	475,500	25,500	23,900	180,000	25,800	6,800	500	6,500	249,000
1907...	596,400	32,900	38,900	225,000	.....	12,300	500	90,900	400,500
1908...	621,500	22,600	85,000	109,700	192,000	4,300	300	23,200	437,800
1909...	370,400	21,400	8,800	89,800	27,000	5,900	200	5,800	158,800
1910...	241,500	23,300	19,500	106,400	29,400	8,600	400	9,200	196,800
1911...	394,200	19,400	24,500	122,400	42,900	8,000	500	7,700	225,400
1912...	475,000	24,000	42,400	151,500	79,400	11,400	400	6,600	315,700
1913...	469,700	17,600	16,500	149,600	10,200	6,800	1,100	9,700	211,000
1914...	305,600	15,100	32,600	50,000	28,400	5,000	600	2,700	134,400
1915...	402,622	32,600	21,300	75,000	14,600	6,400	800	2,200	152,900

NOTE.—Except in the second column of the above table, sand and gravel, rafts, and harbor freight have been omitted, the totals in the last column being the totals after the omission of the classes of traffic mentioned.

2. TENNESSEE RIVER—CHATTANOOGA TO RIVERTON.

(A) OPERATING AND CARE OF HALES BAR LOCK (CHATTANOOGA TO HALES BAR).

The lock was operated and the lock, grounds, buildings, and other improvements were cared for and maintained.

Lock.—Two sluice-gate chains and two roller trains were renewed and other repairs were made to sluice gates. Lighting fixtures were placed over the doors of the controller houses. The walk ways and railings on the lock gates were painted and all metal work about the lock, except the gates, was painted above the water line.

Houses and grounds.—A 4-foot concrete walk was laid in front of the lockmen's houses and connected by lateral walks to each house and to the steps leading to the lock. The aggregate length of these walks was 534 feet. Back fill was placed behind the retaining wall back of the lock, 120 cubic yards of earth being used. The ground south of house "E" was leveled, 200 cubic yards of earth being handled. Forty-four shade trees were set out. A three-fourths-inch pipe line 192 feet long was laid from the well to a point near the lower end of the lock. A line of 1½-inch conduit 128 feet long was laid and wired for the purpose of supplying the pump motor. The handrailings on the outside steps and all screens were painted. Minor repairs were made to foundation of house "E." About 2 acres of the ground around the houses was sown with blue-grass seed, weeds were kept cut from the grounds, and flower beds were made about the houses.

Summary of cost of operating and care of Hales Bar Lock for the fiscal year ending June 30, 1916.

Office and administration.....	\$2, 474. 41
Maintenance and operation of lock.....	4, 441. 61
Maintenance of buildings and grounds.....	1, 304. 65
Miscellaneous expenses and contingencies.....	328. 18
Total.....	8, 548. 85

APPROPRIATIONS.¹

Existing project:	
Mar. 3, 1905.....	\$10, 000. 00
June 30, 1906 (sundry civil act).....	40, 000. 00
Mar. 2, 1907.....	62, 970. 00
Mar. 3, 1909 (allotment dated Mar. 26, 1909).....	15, 000. 00
June 25, 1910.....	50, 875. 00
June 25, 1910 (sundry civil act).....	50, 875. 00
Amount expended from appropriations for Hales Bar to Browns Island.....	6, 668. 87
Total appropriations.....	²236, 388. 87
Receipts from sales.....	165. 89
Total from all sources.....	236, 554. 76

¹ There is no previous project for this particular subdivision of the river. The appropriations under previous projects for the entire section between Chattanooga and Riverton, which includes this subdivision, are given in the appropriations for "(b) Hales Bar to Browns Island."

² An allotment of \$6,000 made June 30, 1904, from the appropriation for examinations, surveys, and contingencies of rivers and harbors, was expended in making preliminary examinations between Scott Point and Hales Bar and is not included in the appropriations for this improvement.

EXPENDITURES.

Year ending June 30—

1914.....	\$1,823.95
1915.....	9,147.49
1916.....	9,020.64
Total	19,992.08

COMMERCIAL STATISTICS.

HALES BAR LOCK, TENNESSEE RIVER.

Freight transported through lock in calendar year 1915.

Articles.	Quantity.	Estimated value.	Articles.	Quantity.	Estimated value.
	<i>Tons.</i>			<i>Tons.</i>	
Brick.....	81	\$259	Live stock—Continued.		
Cement.....	11	77	Hogs.....	62	\$9,300
Coal.....	2,033	4,056	Horses.....	27	9,720
Cotton.....	1,017	244,080	Sheep.....	10	1,200
Cotton seed.....	1,424	37,024	Lumber.....	1,401	28,020
Fertilizer.....	173	4,325	Machinery.....	38	3,800
Flour.....	196	9,800	Merchandise, miscellaneous.....	3,175	238,125
Grain:			Miscellaneous.....	74	7,400
Corn.....	4,070	109,890	Poultry.....	11	4,400
Oats.....	23	713	Produce.....	143	11,440
Wheat.....	13	572	Sand and gravel.....	150	60
Groceries.....	2	300	Straw.....	20	200
Hay.....	410	10,260	Whiskey.....	127	46,800
Iron, scrap.....	1	12	Wood.....	288	576
Lime.....	9	117			
Live stock:			Total.....	15,685	866,046
Cattle.....	606	83,520			

Number of passengers carried, 1,794.

(B) HALES BAR TO BROWNS ISLAND.

No work of improvement was done during the year. Expenditures for office expenses and miscellaneous amounted to \$449.84.

APPROPRIATIONS.¹

Previous projects for open-channel work, Chattanooga to Riverton (see H. Doc. No. 1481, 63d Cong., 3d sess., p. 564).....	\$1,199,228.58
Less balance made available under present project for "(d) Florence to Colbert Shoals".....	198,104.67

Total expended for previous projects between Chattanooga and Riverton for open-channel work..... **\$1,001,123.91**

¹ Including appropriations for previous project for open-channel work at different localities between Chattanooga and Riverton.

² Exclusive of \$12,043.32 expended below Riverton (see Annual Report for 1891, p. 2257), and \$5,000 transferred to Colbert Shoals Canal under joint resolution No. 8, approved Jan. 7, 1910.

³ Exclusive of reimbursements amounting to \$28.21 included in amount of open-channel work expenditures given in reports prior to 1915.

Present project:

July 25, 1912-----	\$10,000.00	
Mar. 4, 1913-----	235,000.00	
July 27, 1916-----	500,000.00	
		\$745,000.00
Less amount expended at Hales Bar-----	6,668.87	1,746,123.91
Transferred under river and harbor act approved Mar. 4, 1915-----	150,000.00	156,668.87
Net total-----		1,589,455.04

ABSTRACT OF CONTRACT.

Survey of Tennessee River between Browns Island and the railroad bridge below the city of Florence.—Contract with Sprague & Henwood (Inc.), of Scranton, Pa., for diamond drilling:

Character of work.	Amount of work.	Unit price.
Rock hole.....linear feet..	9,810	\$2.25
Overburden hole.....do.....	2,330	2.25
Testing holes.....number..	255	5.00
Detailed testing of leaking holes (5-foot lengths).....do.....	200	2.00

Date of contract, March 23, 1915; date of approval, April 2, 1915; date of beginning work, within 10 days after April 8, 1915; date of expiration, September 9, 1915; contract closed and terminated September 4, 1915.

COMMERCIAL STATISTICS.

TENNESSEE RIVER BETWEEN CHATTANOOGA AND FLORENCE.¹

Season of navigation, calendar year 1915: Open all the year between Chattanooga and Decatur. Between Decatur and Florence navigation was suspended from May 15 to December 15, though light-draft traffic was carried on during the low-water season between Lambs Ferry and Lock 6, Muscle Shoals Canal.

Vessel classification.

American registered steamers-----	14
Net registered tonnage-----	875
Unregistered rafts-----	Not reported.

About 20 barges, with a total capacity estimated at 2,915 tons, were employed by the steamboats operating in this section.

¹ Exclusive of \$150,000 transferred to the section Florence to Colbert Shoals by urgent deficiency act of Oct. 22, 1913.

² Commercial statistics are not collected separately for the section of the river between Hales Bar and Browns Island.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Average rate per ton-mile.
				Miles.	Cents.
Brick.....	115,400.....	319	\$1,021	56	1.5
Cement.....	425 barrels.....	86	602	62	4.0
Cement, brick, and lime.....		2,996	23,968	22	(1)
Coal.....		13,307	27,614	26	17.6
Cotton.....	27,443 bales.....	6,861	1,646,640	48	16.7
Cotton seed.....		6,913	23,738	32	4.7
Fertilizer.....		9,685	241,625	167	12.7
Flour.....	2,170 barrels.....	217	10,850	51	4.8
Forest products.....		1,225	24,500	22	(1)
Grain.....		645	23,220	22	(1)
Corn.....	280,755 bushels.....	7,311	197,397	68	2.8
Oats.....	291 bushels.....	4	124	36	3.3
Wheat.....	10,200 bushels.....	306	13,464	75	2.7
Groceries.....		735	110,250	22	(1)
Hay.....	33,732 bales.....	1,686	42,150	74	12.7
Hides, leather, etc.....		466	256,300	22	(1)
Live stock.....		467	84,060	22	(1)
Cattle.....	1,685 head.....	843	101,180	74	3.3
Hogs.....	1,227 head.....	121	18,150	74	6.8
Horses.....	120 head.....	60	21,600	70	8.5
Mules.....	157 head.....	79	28,440	71	8.4
Logs:					
Towed in barges.....	3,833,324 feet b. m.....	11,500	115,000	14	9.0
Rafted.....	858,943 feet b. m.....	2,577	25,770		
Lumber.....	3,482,849 feet b. m.....	9,175	183,500	24	1.9
Machinery.....		3,207	320,700	75	19.4
Merchandise, miscellaneous.....		10,889	816,675	152	3.8
Mill products.....		1,461	58,440	22	(1)
Mines, products of.....		1,591	7,955	22	(1)
Miscellaneous.....		40,406	4,040,600	22	(1)
Oils.....		2,930	73,250	22	(1)
Ores.....		437	196,650	22	(1)
Poultry.....	477 coops.....	29	11,600	68	11.6
Produce, farm.....		6,157	492,590	71	15.7
Rails, iron and steel.....		63	1,890	22	(1)
Sand and gravel.....	17,474 cubic yards.....	26,311	10,484	16	12.2
Stave bolts.....	1,361 cords.....	2,722	32,664	48	1.9
Straw.....	3,000 bales.....	90	9,000	75	2.7
Ties, railroad.....	35,000.....	3,062	15,310	75	.7
Tobacco.....		9	2,160	22	(1)
Total.....		171,328	9,311,081	49	3.4

¹Handled by Nashville, Chattanooga & St. Louis R. R. car ferry. It was impracticable to separate the items.

²Include amounts handled by Nashville, Chattanooga, & St. Louis R. R. car ferry. The tonnage handled in this manner was not used in determining the average distance carried or the average freight rate charged.

Number of passengers carried, 7,634.

The foregoing tabulation includes the freight transferred between the Nashville, Chattanooga & St. Louis Railway Co.'s terminals at Hobbs Island and Guntersville, Ala. Two towboats, handling large transfer barges that accommodate from 8 to 10 freight cars each, are employed by the railway company as a connecting link between its lines on the north and south banks of the river. Freight is not unloaded from the cars, and the railroad keeps no separate traffic records pertaining to this car ferry, but regards it in the same light as any ordinary crossing, although the terminals are 22 miles apart. For the years 1910 to 1914, inclusive, the tonnage handled by this transfer was reported separately.

NOTE.—Commercial statistics are not collected separately for the section of the river between Hales Bar and Browns Island.

The following is a comparative statement of commerce for a period of 10 years, compiled from the annual reports of the Chief of Engineers, United States Army. The unit of the table is the ton of 2,000 pounds.

Tennessee River between Chattanooga and Florence.

Calendar year.	Tonnage as reported in annual reports of Chief of Engineers (total).	Farm products.	Forest products, exclusive of those transported by rafts.	Merchandise, including flour and meal.	Fertilizer.	Miscellaneous, including coal, iron, cement, machinery, etc.	Total.
1906.....	413,800	28,400	205,600	56,500	7,200	20,100	317,800
1907.....	267,900	48,300	42,300	46,700	10,400	20,400	195,000
1908.....	292,500	31,800	52,600	26,800	6,400	29,500	147,100
1909.....	288,800	39,100	55,400	31,500	5,500	55,800	186,800
1910.....	207,100	35,800	63,800	39,100	8,100	29,200	176,100
1911.....	292,000	34,300	69,300	57,900	6,600	69,600	227,900
1912.....	316,200	23,200	60,500	61,100	8,600	53,700	222,100
1913.....	192,800	27,900	36,000	68,700	9,500	19,300	161,300
1914.....	207,800	26,700	33,900	56,200	11,600	23,100	151,200
1915.....	171,800	26,600	27,700	13,800	9,700	64,800	141,100

NOTE.—Except in the second column of the above table, sand and gravel, rafts, and harbor freight have been omitted; the totals in the last column being the totals after the omission of the classes of traffic mentioned.

(C) OPERATING AND CARE OF MUSCLE SHOALS CANAL.

The canal was operated and the lock, canal trunk and embankment, railway, shops, and appliances, buildings and grounds, and floating plant were cared for and maintained during the year.

Locks.—The locks required only minor repairs during the year. The upper valve culvert at Lock A was coffered off and new pins were put in valve stem. Valve pins were also renewed at Locks 2 and 3. The gate, handrailing, and pinion for raising drop gates at Lock 5 were renewed. Repairs were made to walkways on gates at Locks 1, 3, 5, 6, and A; to handrailing on upper gates at Locks 4 and 5; to drop gates at Locks 5, 7, 8, and 9; and to miter posts at Lock 4. The A frames, handrailings, and snubbing posts at Lock 6 and the handrailings at Locks 2, 5, 7, 8, and 9 were painted. The lock chambers were kept clear of deposits and drift was removed from the valves at various times.

Canal trunk and embankment.—Leaks in the canal embankment were stopped at various places and ditches were cut to carry off the seepage from the canal. A temporary dam was constructed across the sluiceway at Lock A, and afterwards repaired several times. Weeds were cut from the embankments for the full length of the two canals. Bushes were removed from the north bank throughout the length of the canals, and overhanging trees were cut along the left bank of Gilchrist Chute. The canals and weirs were kept clear of drift. Minor repairs were made to embankment behind retaining wall and guide wall above Lock A and to the canal embankment at several places. New valves were made for weirs at Bluewater and Six Mile Creeks. New sign posts were erected at the upper entrance to the canal, and nine buoys were placed to mark the channel above Lock A. The drift sluice above Lock 4 and the levee along the drainage ditch at Six Mile Weir were repaired. The ladder dredge *Ala-*

bama, which is used exclusively for maintenance of depths in the canal pools and entrances, was operated for only 19 days during the entire year, its work being confined to the lower division of the canal. In this period all necessary dredging was completed, the material removed amounting to 8,855 cubic yards. The cost of this work was \$341, or 4 cents per cubic yard.

Railway.—The roadbed, which comprises about 16 miles of track, was kept surfaced and grassed during the year. Eleven hundred and forty-five new ties were purchased, 52 of which were placed in track. The wheels and brasses on truck of locomotive No. 5 were renewed, the injector was repaired, and new grate bars were cast. Minor repairs were made to flat cars, caboose, hand cars, velocipede, and pump for supplying water to tank. Locomotive No. 5 was operated for a distance of 22,568 miles, at a cost of \$2,130, or 9.5 cents per mile.

Buildings and grounds.—The kitchen to foreman's house at Lock A, the lockmaster's house at Lock 4, and the colored quarters, kitchens, commissary, meat house, foundry roof, and one room in lock keeper's house at Lock 6 were painted. House screens were renewed or repaired at Locks 1 to 9, inclusive. Repairs were made to porch, steps, and windows of the house at Lock 4, to the house at Lock 3, to the doors and windows of house at Lock 5. At Lock 6 repairs were made to windows of general quarters, to porch of overseer's house, to colored kitchen, to doors in general quarters and hand-car shed, to boathouse, and to sawmill roof. Shelving was erected in commissary. Four closets with concrete foundations were erected and screened. A 500-gallon gasoline storage tank was purchased and installed. The lumber yard was given a thorough cleaning, and all lumber was stacked. All scrap iron on the reservation was collected for condemnation. Fences and water lines at Locks A and 6 were repaired. Three-inch water pipe was purchased for new water line from spring to quarters at Lock 6, and 1,400 linear feet of the ditch for this line was excavated. A road drag and a ditch cleaner were made, and the road was dragged and ditches cleaned from Lock 6 to the Huntsville road.

Shops.—The shops and boat-building equipment, which includes a sawmill, carpenter shop, machine shop, foundry, dry dock, and other facilities, were operated as usual in the construction and repair of floating plant for the different sections of the Tennessee River improvement, as well as that used in connection with the maintenance of the canal. During the year, 286,734 feet b. m. of lumber was sawed, at a cost of \$6.49 per thousand feet b. m.; 130,423 feet b. m. was planed, at a cost of \$3.55 per thousand feet b. m. A total of 670 castings, weighing 42,204 pounds, were made, at an average cost of about 4 cents per pound, including cost of materials. The dry dock was in use 92 days during the year and received eight boats of an aggregate tonnage of 1,517.

Miscellaneous.—Minor repairs were made to the telephone lines and new poles were put in where needed. In connection with the electric-light plant, the turbine was removed from the penstock and new bearings were put in. A windlass for lifting the screen in turbine flume was installed. Repairs were made to electric-light wiring leading to quarters.

CONSTRUCTION AND REPAIR OF PLANT.

The work done on the construction and repair of plant was divided among the different improvements, as follows:

Above Chattanooga.—Cast-iron chocks, etc., were made for the steamer *Ocoee*, at a cost of \$167.52. Three chocks and 6 sheaves were made for the steamer *Chilhowee*, at a cost of \$33.92.

Florence to Colbert Shoals.—Boom sheaves and nine grate bars were made and 2,770 feet b. m. of lumber were furnished for repairs to dredge *Tennessee*, at a cost of \$359.51. The steamer *Lookout* was docked from January 22 to February 28, and all decayed timber was renewed. Castings were made for this boat at various times during the year. The total cost of the work done was \$2,722.19. The dredge *Tusculumbia* was docked on February 28, and all damaged planks were renewed, new castings installed, and new spud casings put on. The repairs were completed on March 9, at a cost of \$1,212.31. Derrick boat *No. 5* was docked for seven days, and repairs were made to hull and machinery, at a cost of \$444.56. Patterns and castings were made for derrick boat *No. 10*, at a cost of \$28.63. Minor repairs were made to the steamer *King*, at a cost of \$42.74. A large amount of miscellaneous work was also done for this subdivision of the river, the costs being charged directly into the open-channel work.

Below Riverton.—The steamer *McPherson* was docked and repairs made to hull. Clamp for wheel-shaft grate and bars were made. The total cost of the work done was \$1,876.41. Dump scows *Nos. 10* and *13* were docked and repaired, at costs of \$608.28 and \$623.20 respectively. Repairs were made to the machinery of the gasoline towboat *White Oak*, at a cost of \$371.74. The steamer *Colbert* was docked and repairs made to hull and fire-door liners, and grate-bar doors were made, at a total cost of \$371.32. Saddle block, sheaves, etc., were made for the dredge *Kentucky*, at a cost of \$109.95. Repairs were made to dredge *Watauga*, dump scow *No. 9*, and derrick boat *No. 15*, at costs of \$20.50, \$9.30, and \$298.53, respectively. A large amount of miscellaneous work was also done for this section of the river, the costs being charged directly into the open-channel work.

Colbert Shoals Canal.—Miscellaneous work was done for this improvement, the cost being charged directly to operating and care.

Muscle Shoals Canal.—The dredge *Alabama* had hull, cabin, deck, boiler, and stack painted. The discharge-pipe lining was renewed. Eight journal boxes for rollers and the shaft, and two boxes and center for bottom tumbler, were renewed. Center spud point was renewed and channels riveted to spud. The boiler was scaled, and 65 flues, 1 brace, and fusible plug were renewed. Pistons of stern spud engines were renewed and new brasses were made for main and swinging engines. The suction pipe for boiler feed pump was renewed. The total cost of the work done was \$1,752.38.

Survey of Tennessee River from Browns Island to Florence Bridge.—Camp equipment was made, camp sites cleared, tents painted and erected, and stadia and transit rods were painted. Drawing boards, stools, map cases, tables, filing cases, etc., were made for the Florence office. Cases were made for cores drilled from the dam sites and cores were stored. Equipment and material for the survey were received, transported, and stored on completion of the work.

Repairs were made to the automobile and truck. The total cost of the work done was \$2,653.93.

Summary of cost of operating and care of Muscle Shoals Canal for the fiscal year ending June 30, 1916.

Office and administration.....	\$5, 158. 22
Maintenance and operation of locks.....	7, 819. 12
Maintenance of canal trunk and embankment.....	5, 110. 83
Maintenance and operation of railway.....	5, 147. 49
Maintenance of floating plant.....	1, 752. 38
Miscellaneous expenses and contingencies.....	697. 03
Maintenance of buildings and grounds.....	8, 893. 05
Total.....	34, 577. 62

APPROPRIATIONS.

Amount expended from the appropriations under the previous project for Chattanooga to Riverton (see H. Doc. 1491, 63d Cong., 3d sess., p. 564)..... \$3, 191, 726. 50

Expenditures from the permanent indefinite appropriation for operating and care.

Year ending June 30—		Year ending June 30—	
1891.....	\$14, 313. 45	1905.....	\$55, 146. 57
1892.....	35, 686. 53	1906.....	40, 105. 02
1893.....	51, 262. 13	1907.....	52, 763. 28
1894.....	58, 735. 63	1908.....	62, 961. 43
1895.....	64, 891. 41	1909.....	53, 443. 56
1896.....	75, 409. 71	1910.....	51, 420. 87
1897.....	66, 021. 78	1911.....	40, 852. 84
1898.....	65, 333. 45	1912.....	52, 219. 36
1899.....	59, 284. 97	1913.....	46, 393. 14
1900.....	65, 281. 03	1914.....	49, 452. 14
1901.....	65, 554. 19	1915.....	46, 230. 15
1902.....	76, 201. 22	1916.....	34, 877. 27
1903.....	85, 186. 52		
1904.....	63, 221. 87	Total.....	1, 441, 249. 57

COMMERCIAL STATISTICS.

MUSCLE SHOALS CANAL, TENNESSEE RIVER.

Freight transported through canal in calendar year 1915.

Articles.	Quantity.	Estimated value.	Articles	Quantity.	Estimated value.
	<i>Tons.</i>			<i>Tons.</i>	
Brick.....	8	\$25	Live stock:		
Cement.....	33	266	Cattle.....	5	\$600
Coal.....	149	398	Hogs.....	2	300
Cotton.....	1, 901	466, 340	Horses.....	4	1, 440
Cotton seed.....	1, 066	27, 716	Logs.....	643	6, 430
Fertilizer.....	1, 447	36, 175	Lumber.....	731	14, 620
Flour.....	101	5, 050	Machinery.....	208	20, 800
Grain:			Merchandise, miscellaneous.....	1, 027	77, 025
Corn.....	441	11, 907	Miscellaneous.....	3	300
Oats.....	4	124	Oil.....	3	75
Groceries.....	138	20, 700	Poultry.....	5	2, 000
Hardware.....	22	1, 100	Produce.....	18	1, 440
Hay.....	8	200	Tobacco.....	5	1, 200
Lime.....	5	65			
			Total.....	7, 982	686, 006

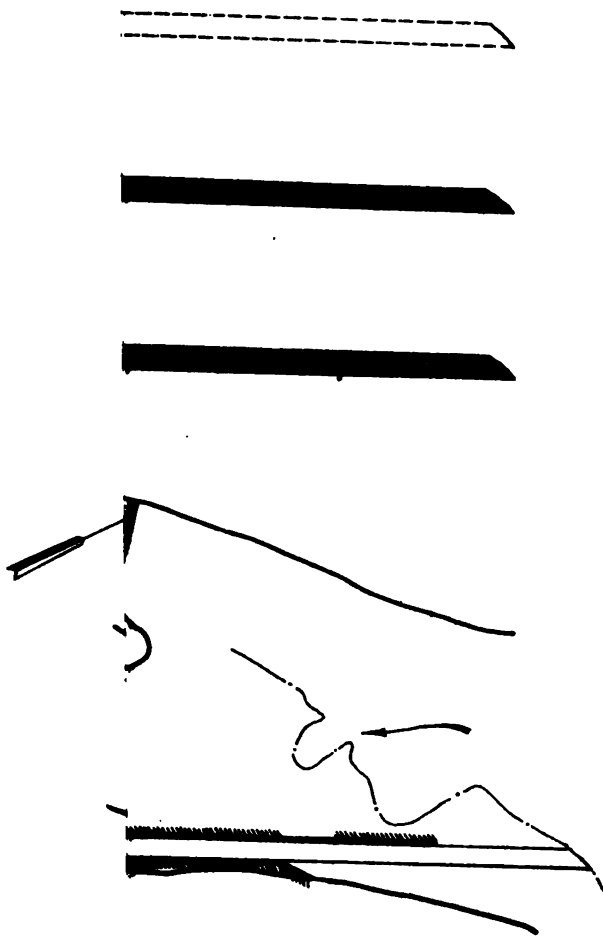
Number of passengers carried, 120.

(D) FLORENCE TO COLEBERT SHOALS.

Operations of floating plant.—The improvements Tuscumbia Bar and Rogers Island Shoal were continued during the fiscal year, and that at Florence Shoal was begun. The work was done by hired labor with the use of the plant belonging to this subdivision, which consists of the dipper dredges *Tennessee* and *Tuscumbia*, the steamers *Lookout* and *King*, 4 derrick boats, 2 drill tenders, 5 dump scows, 3 quarter boats, 2 launches, 3 drill rafts, 14 barges, 1 floating machine shop, and 1 floating carpenter shop. The steamers and several of the auxiliary pieces of the plant, however, did a small amount of work for other sections of the river, while this section received some assistance from plant belonging to other improvements.

Tuscumbia Bar.—For description of this obstruction and the work done prior to the fiscal year see Annual Report for 1915, page 2861. The only work remaining to be done at the beginning of the fiscal year was the redrilling and blasting and the excavating of the high places which had been left in the channel on account of unsuccessful blasting previously done. One drill outfit was employed at this locality from September 20 to October 2, and three outfits from November 1 to November 15. After this time no drilling could be carried on because of high water, the work being impracticable at stages above 2 feet on the Florence gauge. All the high places in the left half of the channel were drilled and blasted over a length of about 7,000 feet, making an aggregate length of 9,000 feet of half the channel width covered to the end of the year. During the year 332 holes, aggregating 1,423 linear feet in depth, were drilled and blasted at a cost of \$5,822.22, or \$4.09 per linear foot, the high cost being due to the fact that the holes were scattered over a large area. The dredge *Tuscumbia* and one derrick boat were engaged for a short time in excavating the blasted material in the left half of the channel about 2,500 cubic yards of rock being removed, over a length of 3,600 feet, at a cost of \$5,361, or \$2.14 per cubic yard. At the end of the year the degree of completion of the work of cleaning the channel was 47 per cent for the drilling and blasting and 30 per cent for the dredging. The costs given include a charge for depreciation of plant amounting to \$1,800.

Rogers Island Shoal.—For description of this obstruction and work done prior to the fiscal year, see Annual Report for 1915, page 2862. The drilling and blasting, which was 65 per cent completed at the beginning of the year, was continued until October, when it was suspended, the degree of completion being 98 per cent. Three drilling outfits were employed in July and August, and two in September and a short time in October, but the work was seriously interrupted by high water, except in the month of August. As in the previous year, the hard and flinty character of the rock necessitated a spacing of 4 by 6 feet for the holes, and that they be drilled to a depth of 4 feet below grade. During the year 9,092 holes, aggregating 45,820 linear feet in depth and covering an aggregate length of 6,500 feet of 150-foot channel, were drilled and blasted at a cost of \$40,958.03, or \$0.894 per linear foot of hole drilled. The rock excavation, which was 25 per cent completed at the beginning of the year, was continued, the degree of completion at the end of the year being 98 per cent. The larger part of the fleet was at this shoal



Rock Excavation

Gravel Excavation

TENNESSEE RIVER
FLORENCE TO COLBERT SHOALS
MOVEMENT OF TUSCUMBIA BAR
CONDITION JUNE 30, 1916

1 sheet. Sheet No. 1

0 500 1000
Engineer Office Nashville, Tenn., June 30, 1916.

Approved

H. H. Hays
Major Corps of Engineers
to accompany annual report for 1916.

during the entire year, the principal exception being the dredge *Tuscumbia*, which was sent to the Muscle Shoals shops for repairs in January and was not again used on this work. On account of high water, excavation was suspended from December 18 to February 14, and was interrupted at other times, the total time lost aggregating about two and one-half months. The work was rendered difficult by the size and hardness of the pieces into which the rock was blasted, some of which contained as large a volume as 10 cubic yards, and frequent repairs to dippers and to scows were necessary. During the year 83,520 cubic yards of rock were removed at a cost of \$83,022.26, or \$0.994 per cubic yard. Except at the lower end of the shoal, excavated material was cast to the right to form a longitudinal dike which was closed at the upper end by dumping. The river channel was contracted by dumped material along the left shore, which projected into the river to form spur dikes at two points. All of this work is included in the cost of rock excavation. The work of removing the material left above grade was started behind the dredges. All high places in an aggregate length of 3,700 feet of the left half of the channel were drilled and blasted, 928 holes aggregating 4,078 linear feet in depth being drilled and blasted at a cost of \$4,483.46, or \$1.10 per linear foot. This material was excavated over a length of 2,000 feet of half the channel width, 1,820 cubic yards of rock being removed at a cost of \$5,285.39, or \$2.90 per cubic yard. The costs given include charges for depreciation of plant amounting to \$21,105.50.

Florence Shoal.—The approved plan for improving this obstruction involves the excavation near the right shore of a channel 150 feet wide and 5 feet deep at extreme low water from the Florence Bridge to a point about 800 feet downstream, the material to be removed consisting of gravel and bowlders, except for a length of about 300 feet, where a flint ledge is encountered at a depth of about 3 feet below low water. The estimate provides for the removal of 2,600 cubic yards of rock and 21,000 cubic yards of gravel at a total cost of \$11,300. No work had been done prior to the fiscal year. The improvement of this shoal was prosecuted by derrick boat *No. 9*, of the Colbert Shoals plant, during parts of July and August; by the dredge *Tuscumbia* from April 5 to June 1; and by derrick boat *No. 10* from May 26 to June 16. The channel was excavated to grade, except at the flint ledge mentioned. In this reach the top layer of the rock, after being loosened by surface blasting, was removed to a depth of about 4 feet below extreme low water. Excavation below this depth will require drilling and blasting. The material removed amounted to 27,250 cubic yards, 10 per cent of which was rock. The cost was \$9,440.64, or \$0.34 per cubic yard, including a charge of \$1,777 for depreciation of plant.

Above Florence Bridge.—Derrick boat *No. 15*, belonging to the "below Riverton" fleet, excavated a channel 60 feet wide and 900 feet long at the slag pile above the Florence Bridge and removed a small amount of material at Fertilizer Landing. The cost of the work done was \$285.73.

Ice plant and shops.—The floating ice plant was operated, except during the winter months, for the entire year, and ice was furnished to the forces at Muscle Shoals Canal and below Riverton as well as to those in this subdivision. The machine shop was operated 24

hours daily from July to October and 16 hours per day in the remainder of the year, with the exception of the high-water period through December, January, and February, doing all the lathe work required by the forces below Riverton in addition to its work for this subdivision. The carpenter shop was constantly used during the dredging period in making repairs, principally to barges and scows injured by handling rock removed at Rogers Island. During the winter lay up it was used at the Muscle Shoals shops.

Floating plant.—The field forces constructed a new hull for launch No. 7 and transferred the machinery at a cost of \$241.44, including a charge of \$12.64 by the Muscle Shoals shops. Various repairs were made to plant in the field and at the Muscle Shoals shops, the principal items of which were: Dredge *Tuscomb*, \$5,236.87; dredge *Tennessee*, \$5,138.61; steamer *Lookout*, \$4,036.72; steamer *King*, \$685.20; dump scow No. 12, \$888.62; dump scow No. 5, \$797.52; dump scow No. 7, \$656.87; derrick boat No. 5, \$907.49; derrick boat No. 16, \$544.70; barge No. 47, \$607.75; dump scow No. 11, \$403.24; barge No. 46, \$389.66. A number of other pieces had repairs of lesser amounts. The cost of all repairs made at the Muscle Shoals shops for this subdivision of the river was \$4,809.94. All repair costs were prorated into the different items of open-channel work.

The following is a summary of the cost of all operations in this subdivision of the river during the year:

Open-channel work:	
Net field cost.....	\$97, 209. 23
Repairs to plant.....	23, 322. 83
Nashville office charges.....	2, 531. 05
Caring for fleet while not working and similar expenses.....	6, 913. 12
Depreciation of plant.....	24, 671. 50
Total.....	154, 647. 73
Construction and purchase of plant and equipment.....	1, 135. 18
Total.....	155, 782. 91

APPROPRIATIONS.

Present project:¹

Balance remaining from previous appropriations.....	\$198, 104. 67
July 25, 1912.....	120, 000. 00
Mar. 4, 1913.....	100, 000. 00
Oct. 22, 1913 (urgent deficiency act).....	150, 000. 00
Oct. 2, 1914 (allotment dated Oct. 15, 1914).....	110, 000. 00
Mar. 4, 1915 (allotment dated Apr. 1, 1915).....	100, 000. 00
Mar. 4, 1915 (allotment dated Oct. 12, 1915).....	85, 000. 00
July 27, 1916.....	120, 000. 00
Total appropriations.....	983, 104. 67
Received from sales (previous projects, Chattanooga to Riverton).....	\$963. 50
Received from sales (present project).....	235. 14
	1, 198. 64
Receipts from all sources.....	984, 303. 31

¹ There is no previous project for this particular subdivision of the river. The appropriations under previous projects for the entire section between Chattanooga and Riverton, which includes this subdivision, are given under "(b) Hales Bar to Browns Island."

COMMERCIAL STATISTICS.

Commercial statistics are not collected separately for this subdivision of the river. See under "3. Tennessee River below Riverton."

(E) OPERATING AND CARE OF COLBERT SHOALS CANAL (HEAD COLBERT SHOALS TO RIVERTON).

The lock was operated, and the lock, canal, grounds, buildings, and other improvements were cared for and maintained.

Lock.—In order to repair the valves and miter sills a cofferdam was built across the upper end of the lock, and the lock was pumped out, the lower end being coffered by means of the guard gates. The miter sills were found to have been loosened by the crushing of the concrete between the steel contact plates and the masonry of the sills, part of the upper corners of the masonry being also crushed. All of the concrete at the lower sills and about half of that at the upper sills was removed, and the stone was cut out to give a 3 to 6 inch greater width of concrete. Most of the anchor bolts in the steel plates were found to be loose, and those were carefully regROUTED. The recesses between steel and masonry were reconcreted, the concrete being tied down to the masonry by $\frac{3}{4}$ -inch twisted steel bars, 12 inches long and spaced about 10 inches apart. On account of deformation while the contact plates were loose, or on account of inaccuracy of original construction, a good contact could not be obtained between the gates and the steel plates. The vertical miter plates on the lower gates had been bent at places by drift which had been caught between them when the gates were closed. These were straightened and dressed off in places, so as greatly to improve the contact. No provision having been made in the original design for lubricating the pins connecting the gates to the anchorage, the great friction resulted in a loud chatter as the gates were moved. The pins were removed, oil ways were cut in them, and grease cups mounted. The upper and lower lock gates were painted. Minor repairs were made to the Stoney valves. The total cost of the repairs and painting was \$5,012.15. Deposit was dredged from the lock pit by derrick boat No. 9, at a cost of \$225.17.

Canal trunk and embankment.—Additional paving was done at weir No. 1, 532 square yards being placed at a cost of \$403.26, or \$0.76 per square yard. Weeds and undergrowth were cut on the north side of the canal from the lock to the bear trap, a distance of 5 miles.

Buildings and grounds.—The buildings (five in number, exclusive of small outbuildings) were given minor repairs. Fences were repaired, weeds and grass kept cut, rubbish removed, and roads and ditches repaired. Thirty rods of new American railroad-wire fence were built, using the concrete posts made prior to the fiscal year.

Floating plant.—The floating plant consists of derrick boat No. 9, gasoline launch *Clinch*, barges Nos. 44 and 45, and a small ferry flat. Minor repairs were made to the machinery on the derrick boat and the launch.

Summary of cost of operating and care of Colbert Shoals Canal for the fiscal year ending June 30, 1916.

Office and administration.....	\$1, 440. 89
Maintenance and operation of lock.....	7, 080. 10
Maintenance of canal trunk and embankment.....	5, 058. 96
Maintenance of buildings and grounds.....	1, 122. 31
Maintenance of floating plant.....	726. 52
Miscellaneous expenses and contingencies.....	150. 90
Total.....	15, 598. 68

APPROPRIATIONS.**Present project:¹**

Sept. 19, 1890.....	150, 000. 00
June 13, 1892.....	300, 000. 00
Aug. 14, 1894.....	245, 000. 00
Mar. 8, 1899.....	100, 000. 00
June 13, 1902.....	290, 000. 00
Mar. 8, 1903 (sundry civil act).....	350, 000. 00
Mar. 3, 1905.....	200, 000. 00
Mar. 3, 1905 (sundry civil act).....	50, 000. 00
June 30, 1906 (sundry civil act).....	100, 000. 00
Mar. 2, 1907.....	290, 000. 00
Mar. 4, 1907 (sundry civil act).....	100, 000. 00
Mar. 27, 1908 (sundry civil act).....	98, 000. 00
Mar. 4, 1909 (sundry civil act).....	120, 000. 00
June 25, 1910.....	100, 000. 00
Received by transfer from between Chattanooga and River- ton, under joint resolution No. 8 approved Jan. 7, 1910.....	5, 000. 00
Total appropriations.....	²2, 313, 000. 00
Received from sales.....	530. 27
Received from surety of failing contractor.....	8, 629. 00
Receipts from all sources.....	²2, 322, 179. 27

*Expenditures from the permanent indefinite appropriation for operating and care.***Year ending June 30—**

1912.....	\$7, 991. 86
1913.....	38, 639. 37
1914.....	22, 425. 17
1915.....	18, 968. 59
1916.....	15, 463. 96

Total..... 108, 509. 05

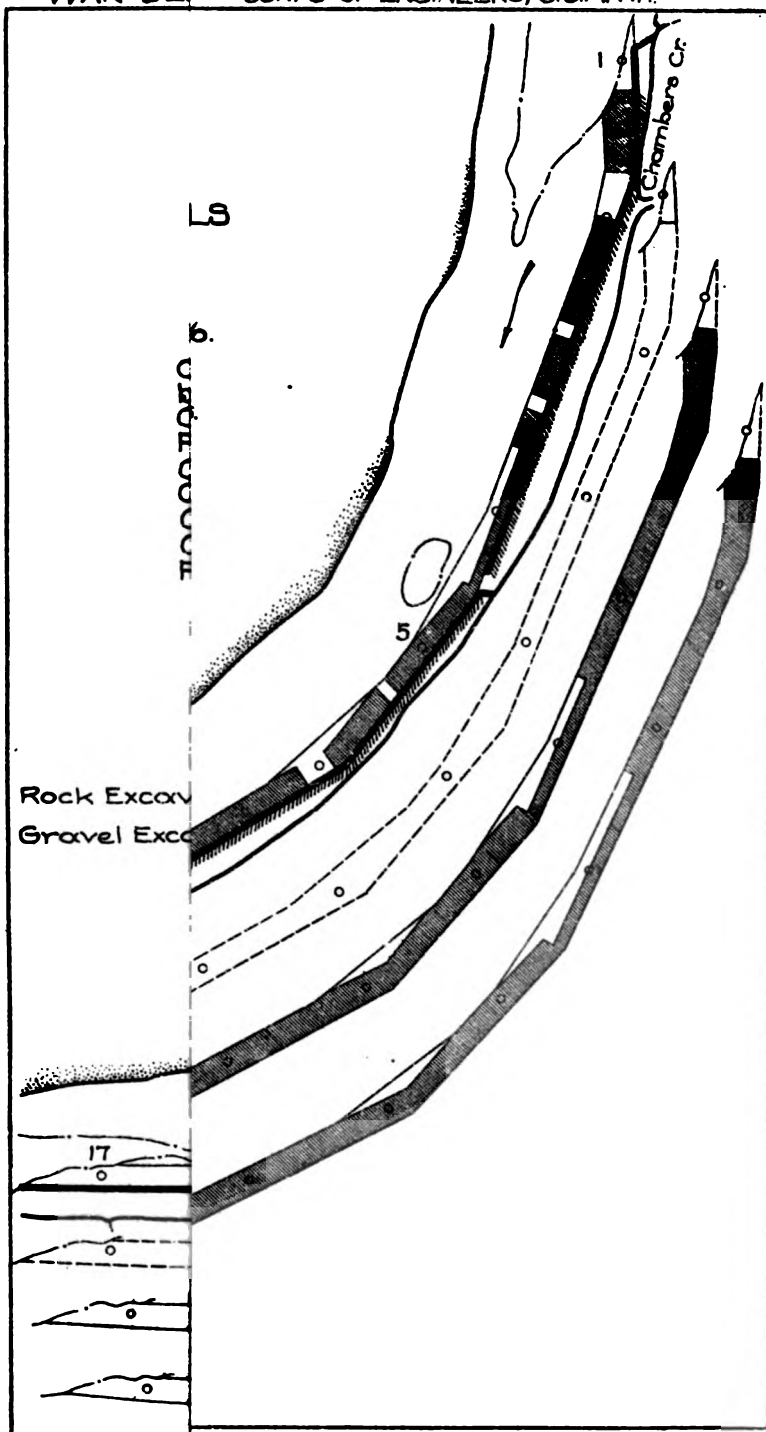
WORK OF IMPROVEMENT.

The balance of the appropriations for the construction of the Colbert Shoals Canal was expended in dredging the lower approach to the lock. A channel 110 feet wide and 780 feet long was dredged, 5,000 cubic yards of loose material being removed. The entire balance available, amounting to \$825.57, was expended.

¹ There is no previous project for this particular subdivision of the river. The appropriations under previous projects for the entire section between Chattanooga and Riverton, which includes this subdivision, are given under "(b) Sales Bar to Browns Island."

² Including \$450, reported erroneously in the 1915 report as being transferred to other works, under authority of river and harbor act of Mar. 4, 1915.

³ Exclusive of \$3.00 for reimbursements included in reports prior to 1915.



c. No. ; 64th Cong., 2d Sess.

COMMERCIAL STATISTICS.

COLBERT SHOALS CANAL, TENNESSEE RIVER.

Freight transported through canal in calendar year 1915.

Articles.	Quantity.	Estimated value.	Articles.	Quantity.	Estimated value.
	<i>Tons.</i>			<i>Tons.</i>	
Brick.....	43	\$125	Live stock—Continued.		
Cement.....	5	35	Horses.....	5	\$1,800
Cotton.....	109	26,160	Sheep.....	2	240
Cotton seed.....	320	8,320	Logs.....	225	2,250
Fertilizer.....	492	12,360	Lumber.....	554	11,080
Flour.....	136	6,800	Machinery.....	8	800
Grain:			Merchandise, miscellaneous.....	955	71,625
Corn.....	962	25,704	Poultry.....	19	7,600
Oats.....	3	63	Produce.....	149	1,520
Wheat.....	5	220	Salt.....	26	260
Groceries.....	233	34,950	Ties, railroad.....	25,920	129,600
Hay.....	158	3,950	Coal.....	1,925	3,850
Lime.....	5	65			
Live stock:			Total.....	32,271	352,150
Cattle.....	17	2,040			
Hogs.....	5	750			

Number of passengers carried, 1,526.

3. TENNESSEE RIVER BELOW RIVERTON.

Operation of floating plant.—The improvements at Big Bend and Bear Creek Shoals were continued during the year and that at Indian Creek Shoals was begun. The work was done by hired labor with the use of the dredges *Kentucky*, *Watauga*, and *Tishomingo*, the towboats *Colbert*, *McPherson*, and *White Oak*, 1 derrick boat, 4 dump scows, 9 barges, 2 drill tenders, 2 drill rafts, 1 quarter boat, 1 launch. Several of these pieces, however, were used for short periods on work at Colbert Shoals Canal and above the Florence Bridge, while some assistance was rendered this section by plant belonging to other improvements. The entire fleet was laid up on account of high water from January 1 to April 20.

Big Bend Shoals.—For description of this obstruction and the work done prior to the fiscal year see Annual Report for 1915, page 2864. The drilling and blasting, which had been completed over the full channel width for an aggregate length of about 8,950 linear feet prior to the fiscal year, was continued during the year, an aggregate length of 3,090 linear feet of full channel width being covered. The work was seriously interfered with by high water, with the result that drilling was carried on for a total of only 35 days. During the year 9,446 holes were drilled, aggregating 51,927 linear feet in depth. The spacing of the holes varied from 6 feet by 6 feet to 6 feet by 10 feet, the greater part of the rock drilled being soft and easily drilled. The drilling and blasting was 90 per cent completed at the end of the year. The cost of the work done during the year was \$38,254.96, or \$0.787 per linear foot of hole. Blasted rock amounting to 32,425 cubic yards was removed, at a cost of \$23,150.24, or \$0.714 per cubic yard. Gravel amounting to 5,205 cubic yards was removed, at a cost of \$1,171.08, or \$0.225 per cubic yard. Practically all of the rock left above grade by

the first dredging, in an aggregate length of 11,100 feet of full channel width, was removed, at a cost of \$26,887.59. The rock excavation was 70 per cent completed at the end of the year. The costs given include charges for depreciation of floating plant, amounting to \$17,019.17.

Bear Creek Shoals (2 miles below Riverton).—The approved plan of improvement involves the excavation of a channel 150 feet wide and 5 feet deep at extreme low water for a distance of 9,650 feet along the right bank and nearly parallel thereto. It involves the excavation of 77,000 cubic yards of gravel and the construction of dikes containing 1,000 cubic yards of quarried stone, at a total estimated cost of \$21,000. The original available depth at extreme low water was about 16 inches. The gravel is loose and easily removed. Gravel amounting to 52,000 cubic yards was removed prior to the fiscal year. Allowing 1 foot for overcut, the gravel removed during the fiscal year amounted to 224,067 cubic yards. The cost was \$25,835.95, or \$0.115 per cubic yard. The work was done by the dredge *Watauga*, the first two cuts being cast to the right to form a training wall for practically the entire length of the channel, the wall being connected with the bank at the upper end. The work was carried on from August to December and completed in an additional working period of about five weeks near the end of the year. The cost of removing the material above grade and of placing material in the closing dike was \$3,014.10. The costs given include charges for depreciation of plant amounting to \$7,053.

Indian Creek Shoals (6 miles below Riverton).—The approved plan of improvement involves the excavation of a channel 150 feet wide and 5 feet deep at extreme low water for a distance of 11,150 feet along the left bank and nearly parallel thereto. It involves the excavation of 80,000 cubic yards of gravel, at an estimated cost of \$17,500. This improvement was begun on June 8, the dredges *Kentucky* and *Watauga* and steamers *Colbert* and *McPherson* and attendant plant being used. To the end of the year 26,667 cubic yards of gravel had been dredged, at a cost of \$6,527.54, or \$0.245 per cubic yard, including charge of \$2,178 for depreciation of plant. The improvement was 33 per cent completed at the end of the year.

Maintenance.—The river was cleared of snags and similar obstructions from Riverton to Eagle Nest Island, a distance of 63 miles. The work was done by hired labor with the use of the *White Oak* and one barge and one derrick boat. The cost was \$2,404.65, including a charge of \$263 for depreciation of plant and \$141.80 for repairs to plant.

Floating plant.—Various pieces of plant were repaired by the field forces and by the Muscle Shoals shops, the principal items of which were: Dredge *Kentucky*, \$3,890.55; dredge *Tishomingo*, \$2,777.09; dredge *Watauga*, \$3,536.92; steamer *McPherson*, \$2,308.12; steamer *Colbert*, \$2,315.59; dump scow No. 10, \$820; dump scow No. 13, \$723.97; barge No. 54, \$475.51; barge No. 55, \$451.12; derrick boat No. 15, \$470.76; towboat *White Oak*, \$416.79; drill tender No. 3, \$413.05; dump scow No. 9, \$376.14; launch No. 6, \$229.46. A number of other pieces were also repaired at less costs. The total cost of repairs made at the Muscle Shoals shops for this section of the river was \$4,361.23. The cost of all repairs has been prorated into the different items of open-channel work.

Summary of the cost of all operations in this section of the river during the year.

Net field cost.....	\$80,714.33
Repairs to plant.....	19,709.93
Nashville office charges.....	2,425.88
Caring for fleet while not working and similar expenses.....	18,014.45
Depreciation of plant.....	28,978.17
Equipment.....	487.17
Total.....	128,329.93

Increase in project estimate.—The report on reexamination of the project for improving the Tennessee River, which contains an increase of \$24,000 in the project estimate for this section of the river, was approved by the Chief of Engineers (H. Doc. No. 981, 64th Cong., 1st sess.). This increase was necessitated principally by reason of the fact that the original estimate made insufficient allowance for material necessarily removed below the grade line of the excavated cuts.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 565).....	\$645,375.06
Present project:	
July 25, 1912.....	\$110,000.00
Mar. 4, 1913.....	110,000.00
Oct. 2, 1914 (allotment dated Oct. 16, 1914).....	123,000.00
Mar. 4, 1915 (allotment dated Apr. 1, 1915).....	251,000.00
July 27, 1916.....	24,000.00
	618,000.00
Total of appropriations.....	1,263,375.06
Received from settlement of damages to dredges (previous project).....	276.93
Received from sales (previous project).....	572.96
Received from sales (present project).....	177.53
	1,027.42
Receipts from all sources.....	1,264,402.48

COMMERCIAL STATISTICS.

TENNESSEE RIVER BELOW FLORENCE.

Season of navigation, year 1915: Open all the year.

Vessel classification.

American registered steamers.....	22
Net registered tonnage.....	2,450
Unregistered rafts.....	Not reported.

About 70 barges, with a total capacity estimated at 40,330 tons, were employed by the steamboats operating on this section of the river.

* Including \$12,043.32 expended from appropriations for improving Tennessee River below Chattanooga and exclusive of an unexpended balance of \$866 of the emergency allotment from the act of Mar. 3, 1909, returned to the Treasury.

* Including \$150,000 transferred from "Hales Bar to Browns Island."

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Average rate per ton-mile.
Brick.....	181,265.....	361	\$1,155	Miles. 146	Cents. 1.1
Coal.....	.....	675	1,350	98	1.6
Cement.....	3,416 barrels.....	683	4,781	146	1.3
Cotton.....	13,981 bales.....	3,483	825,920	180	2.0
Cotton seed.....	.....	3,893	101,218	150	1.2
Fertilizer.....	.....	1,428	35,700	150	1.2
Flour.....	30,870 barrels.....	3,087	154,359	149	1.7
Grain:					
Corn.....	36,553 bushels.....	1,024	27,648	99	1.7
Oats.....	10,370 bushels.....	154	4,774	108	1.8
Wheat.....	9,791 bushels.....	294	12,695	110	1.8
Hay.....	13,373 bales.....	669	16,725	94	2.4
Hoops.....	305,000 bundles.....	615	9,235	150	1.2
Lime.....	275 barrels.....	28	364	150	1.2
Live stock:					
Cattle.....	2,436 head.....	1,218	145,180	68	4.4
Hogs.....	10,124 head.....	1,012	151,800	111	2.7
Horses.....	183 head.....	92	33,120	123	2.9
Mules.....	34 head.....	17	6,120	98	5.0
Sheep.....	121 head.....	5	600	100	5.0
Logs:					
Towed in barges.....	2,000,000 feet b. m.....	6,000	80,000	100	1.0
Rafted.....	3,139,201 feet b. m.....	9,418	94,180	.....	.....
Lumber.....	4,980,916 feet b. m.....	9,961	197,230	153	1.2
Machinery.....	.....	5	500	35	.....
Marble.....	.....	15	225	150	2.2
Miscellaneous, miscellaneous.....	.....	15,701	1,177,575	116	2.4
Mussel shells.....	.....	234	1,732	100	2.0
Nuts.....	62,707 bags.....	3,135	313,500	149	1.9
Poultry.....	3,514 coops.....	219	57,000	31	2.5
Produce, farm.....	.....	234	15,720	99	4.1
Salt.....	6,785 barrels.....	1,158	21,880	150	1.3
Scrap iron.....	.....	20	240	100	2.0
Shingles.....	.....	10	250	150	2.0
Stave bolts.....	104,450.....	10	720	100	1.0
Ties, railroad:					
Towed in barges.....	2,921,999.....	255,676	1,275,380	172	0.4
Rafted.....	1,683,483.....	145,180	740,900	.....	.....
Tobacco.....	439 hogheads.....	323	77,380	149	2.0
Poles, telephone and telegraph (rafted).....	5,000.....	2,000	20,000	.....	.....
Total.....	.....	471,006	5,624,908	106	0.6

Number of passengers carried, 12,557.

The following is a comparative statement of commerce for a period of 10 years, compiled from the annual reports of the Chief of Engineers, United States Army. The unit of the table is the ton of 2,000 pounds.

Tennessee River between Florence and Paducah.

Year.	Tonnage as reported in annual reports of Chief of Engineers (Totals).	Farm products.	Forest products, exclusive of those transported by rafts.	Iron ore.	Marble.	Miscellaneous, including flour and meal.	Fertilizer.	Miscellaneous, including coal, iron, cement, machinery, etc.	Totals.
1906.....	766,100	39,800	623,800	.....	300	44,800	1,500	1,900	713,200
1907.....	643,100	33,000	480,300	.....	.....	34,100	1,900	6,100	555,400
1908.....	552,600	38,300	410,600	.....	.....	87,600	2,300	9,600	498,200
1909.....	375,600	52,200	263,000	.....	.....	28,500	1,600	3,200	337,500
1910.....	464,000	37,400	377,600	.....	.....	37,100	1,400	5,500	440,200
1911.....	431,100	28,800	319,300	.....	200	26,900	2,700	4,400	369,500
1912.....	373,600	22,300	305,000	.....	.....	16,300	1,700	2,800	320,200
1913.....	480,000	15,900	339,500	.....	100	15,300	1,800	2,900	437,000
1914.....	450,000	21,800	307,600	.....	100	12,800	1,800	5,100	390,200
1915.....	471,006	15,771	373,222	.....	15	18,768	1,428	3,184	311,466

NOTE.—Except in the second column of the above table, sand and gravel, rafts, and harbor freight have been omitted; the totals in the last column being the totals after the omission of the classes of traffic mentioned.

APPROPRIATIONS FOR TENNESSEE RIVER (CONSOLIDATED).¹

Section of river.	Previous projects.	Present project. ²	Total for all projects.
Knoxville to Kellys Ferry.....	\$51,406.04	.....	\$51,406.04
(1) Above Chattanooga:			
(a) Caney Creek lock and dam.....		\$25,614.57	25,614.57
(b) Open-channel work.....	\$86,760.37	1,064,722.18	1,921,482.55
Total.....	\$86,760.37	1,080,336.75	1,947,097.12
(2) Chattanooga to Riverton:			
Open-channel work (entire section).....	1,001,123.91		1,001,123.91
(a) Hales Bar lock and dam.....		* 236,554.76	236,554.76
(b) Hales Bar to Browns Island.....		586,331.13	586,331.13
(c) Muscle Shoals improvement.....	3,191,724.50		3,191,724.50
(d) Florence to Colbert Shoals.....		984,303.31	984,303.31
(e) Colbert Shoals Canal.....		* 2,322,179.27	2,322,179.27
Total.....	4,192,848.41	4,131,368.47	8,324,216.88
(3) Below Riverton.....	645,375.06	619,027.43	1,264,402.49
Total for river.....	5,756,362.78	5,830,732.64	11,587,125.42

¹ Inclusive of amounts received from other sources, but exclusive of reimbursements.

² Includes receipts from other sources under previous project.

* An allotment of \$6,000, made June 30, 1904, from the appropriation for examinations, surveys, and contingencies of rivers and harbors, was expended in making preliminary examinations between Scott Point and Hales Bar and is not included in the appropriations for this improvement.

* Including \$650 erroneously reported in the Annual Report for 1915, as transferred to other works under authority of river and harbor act approved Mar. 4, 1916.

4. FRENCH BROAD AND LITTLE PIGEON RIVERS, TENN.

Operations of floating plant.—Open-river work was carried on during the year at Cement Shoals, Bowman Shoals, Hinds Bar, Pattys Bar, and Caywood Island. The work was done by hired labor, with the use of the gasoline tender *Niota*, two derrick boats, six barges, and two quarter boats. Very little work was done between December 15 and March 20 on account of high water. No work was done on the Little Pigeon River.

Cement Shoals.—For description and the work done prior to the fiscal year see Annual Report for 1915, page 2873. The improvement was 2 per cent completed at the beginning of the year. During the year 7,936 linear feet of dike were constructed, containing 4,825 cubic yards of quarried stone. The cost was \$7,298.22, or \$1.51 per cubic yard of stone used. Gravel amounting to 6,415 cubic yards was excavated, at a cost of \$5,522.42, or \$0.86 per cubic yard. Stone amounting to 4,805 cubic yards was quarried, at a cost of \$5,631.31, or \$1.17 per cubic yard. The improvement was completed during April.

Bowman Shoals (7 miles above the mouth).—The approved plan of improvement involves the excavation of 8,000 cubic yards of gravel from a channel 90 feet wide and 2½ feet deep at ordinary low water for a distance of about 2,200 feet, and for the construction of about 3,000 linear feet of dike, made of excavated material, about 2,200 linear feet being formed by casting the excavated material, at a total estimated cost of \$2,000. No work was done under this plan prior to the fiscal year. During the year a 50-foot width of the channel was completed, 4,300 cubic yards of gravel being removed and cast into a training wall along the left side of the channel. The material in a

length of 90 feet was removed from the end of an old dike that obstructed the channel and placed in a dike to connect the upper end of the east training wall with the bank. The cost of all work done was \$2,615.81, or \$0.61 per cubic yard of excavated material. The improvement was 75 per cent completed at the end of the year.

Miscellaneous.—With a view of increasing the controlling channel dimensions and improving the navigable conditions as much as possible, with the funds available, the following miscellaneous work was done, the cost being charged to maintenance:

Gravel excavation at Campbells Shoals, 225 cubic yards, at \$0.516 per cubic yard	\$116.24
Gravel excavation at Pattys Bar, 1,100 cubic yards, at \$1.40 per cubic yard	1,541.74
Gravel excavation at Hinds Bar, 100 cubic yards, at \$1.31 per cubic yard	130.79
Repairs to dike at Caywood Island, 175 cubic yards, at \$2.99 per cubic yard	523.77
Total	2,312.54

The costs given include charges for depreciation of plant, amounting to \$2,850.

Surveys.—Surveys were made at Bowman Shoal and Johnson Island Shoal, and studies were made in connection with the improvement of Seven Island Shoals; the costs being \$267.92, \$670.62, and \$149.59, respectively.

Floating plant.—Repairs were made to the floating plant at the following costs: Derrick boat *No. 13*, \$740.07; derrick boat *No. 4*, \$437.64; barge *No. 42*, \$166.41; tender *Niota*, \$138.32; barge *No. 43*, \$107.49; and miscellaneous, \$87.68. All costs of repairs to floating plant have been prorated to the different items of open-channel work. The tender *Niota* was accidentally set on fire and partially destroyed during the latter part of June.

Increase in project estimated.—The report on reexamination of the French Broad River, which increases the project estimate for the work below Dandridge from \$227,000 to \$241,485, was approved by the Chief of Engineers (H. Doc. No. 489, 64th Cong., 1st sess., p. 8). The necessity for this increase was due principally to the fact that the last revised estimate was based on old surveys which did not give sufficient data from which accurate estimates could be made.

APPROPRIATIONS.

Previous project, French Broad River, N. C. (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 454)	\$43,000.00
Present project, French Broad River, Tenn.:	
June 14, 1880	\$10,000.00
Mar. 3, 1881	8,500.00
Aug. 2, 1882	5,000.00
July 5, 1884	3,500.00
Aug. 5, 1886	6,000.00
Aug. 11, 1888	10,000.00
Sept. 19, 1890	10,000.00
July 13, 1892	15,000.00
Aug. 18, 1894	7,000.00
June 3, 1896	5,000.00
Mar. 8, 1899	5,000.00
June 18, 1902	15,000.00
Mar. 8, 1905	2,000.00

Present project, French Broad River, Tenn.—Continued.

Mar. 2, 1907-----	\$2,000.00
Mar. 3, 1909 (allotment dated Apr. 9, 1909)-----	5,000.00
June 25, 1910-----	23,000.00
July 25, 1912-----	15,000.00
Mar. 4, 1913-----	15,000.00
Oct. 2, 1914 (allotment dated Oct. 24, 1914)-----	10,000.00
Mar. 4, 1915 (allotment dated Apr. 18, 1915)-----	30,000.00
	<hr/> \$197,000.00
Total of appropriations-----	240,000.00
Received from sales under present project-----	503.01
Total receipts from all sources-----	<hr/> 240,503.01

COMMERCIAL STATISTICS.

FRENCH BROAD RIVER, TENN.

Season of navigation, year 1915: Open all the year.

Vessel classification.

American registered steamers-----	2
Net registered tonnage-----	71
Unregistered rafts-----	Not reported.

About 9 barges, with a total capacity estimated at 360 tons, were employed by the steamboats operating on this river.

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Average haul or distance freight was carried.	Average rate per ton-mile.
				<i>Miles.</i>	<i>Cents.</i>
Brick-----	17,000-----	47.00	\$150	46	2.5
Coal-----	-----	40.00	80	46	4.0
Flour-----	440 barrels-----	44.00	2,200	46	5.0
Grain:					
Corn-----	121,088 bushels-----	3,390.00	91,530	46	2.8
Oats-----	1,140 bushels-----	17.00	537	46	3.2
Wheat-----	82,392 bushels-----	2,472.00	108,768	46	2.8
Hay-----	18,273 bales-----	914.00	22,650	46	2.9
Live stock:					
Cattle-----	5 head-----	3.00	360	46	2.0
Hogs-----	483 head-----	48.00	7,200	46	6.6
Logs:					
Towed in barges-----	8,247 feet b. m.-----	25.00	250	46	2.6
Rafted-----	223,309 feet b. m.-----	670.00	6,700	46	2.6
Lumber-----	49,470 feet b. m.-----	99.00	1,980	46	2.0
Machinery-----	-----	30.00	3,000	46	10.0
Merchandise, miscellaneous-----	-----	1,005.00	75,375	46	10.0
Poultry-----	4 coops-----	.24	96	46	8.7
Straw-----	2,074 bales-----	62.00	620	46	2.8
Total-----	-----	8,866.24	322,686	46	3.8

5. CLINCH AND HIWASSEE RIVERS, TENN. AND VA.

(A) CLINCH RIVER.

No work was done during the fiscal year.

APPROPRIATIONS.

June 14, 1880-----	\$10,000.00
Mar. 3, 1881-----	3,000.00
Aug. 2, 1882-----	3,000.00

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July 5, 1884.....	\$5,000.00
Aug. 5, 1886.....	5,000.00
Aug. 11, 1888.....	5,000.00
Sept. 19, 1890.....	4,000.00
July 13, 1892.....	4,000.00
Aug. 18, 1894.....	2,500.00
Mar. 3, 1899.....	8,500.00
June 13, 1902 (allotment dated July 5, 1902).....	3,000.00
Mar. 3, 1905 (allotment dated Apr. 10, 1905).....	1,500.00
Mar. 2, 1907 (allotment dated Mar. 25, 1907).....	825.43
June 25, 1910 (allotment dated Oct. 7, 1910).....	7,000.00
Total of appropriations.....	61,825.43
Transferred to other works under authority of river and harbor act approved Mar. 4, 1915.....	¹ 3.00
Net total.....	61,822.43
Received from sales.....	45.10
Total receipts from all sources.....	61,867.53

COMMERCIAL STATISTICS.

No commerce was reported, except the rafting of 5,191 tons of logs and 100 tons of lumber, valued at \$53,910.

(B) HIWASSEE RIVER.

No work was done during the fiscal year.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 464).....	\$36,500.00
Present project:	
June 13, 1902 (allotment dated July 5, 1902).....	\$10,000.00
Mar. 3, 1905 (allotment dated Apr. 10, 1905).....	4,500.00
Mar. 2, 1907 (allotment dated Mar. 25, 1907).....	55,282.40
Mar. 3, 1909 (allotment dated Apr. 9, 1909).....	5,000.00
June 25, 1910 (allotment dated Oct. 7, 1910).....	10,000.00
July 25, 1912.....	5,000.00
	89,782.40
Total of appropriations.....	126,282.40
Transferred to other works, under authority of river and harbor act approved Mar. 4, 1915.....	3,216.00
Net total.....	123,066.40
Receipts from sales.....	8.23
Total receipts from all sources.....	123,074.63

COMMERCIAL STATISTICS.

No commerce was reported for the calendar year 1915.

¹ Reported erroneously in the Annual Report for 1915 as \$573.57.

CONSTRUCTION OF LOCKS AND DAMS ON THE OHIO RIVER.

REPORT OF THE DISTRICT OFFICERS HAVING CHARGE OF SLACK-WATER IMPROVEMENT OF THE OHIO RIVER.

LOCKS AND DAMS.

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FOR DESCRIPTION OF THESE IMPROVEMENTS SEE PAGES 1202 TO 1214.

LOCKS AND DAMS NOS. 7, 9, AND 10, OHIO RIVER.

REPORT OF LIEUT. COL. FRANCIS R. SHUNK, CORPS OF ENGINEERS.

PITTSBURGH, PA., DISTRICT.

LOCK AND DAM NO. 7.

This structure was in operation at the beginning of the year, and was completed, except a portion of the dredging of the lock approaches, which work was then being performed by a Government dredging plant consisting of a dipper dredge, with a steamboat acting as tender, and the erection on the lock of a steel light tower, now under contract. Dredging was continued until July 23, 1915, 13,601 cubic yards of bowlders and gravel being removed. An ample depth of water for the ordinary needs of navigation through the lock having been secured, projecting bowlders were scraped into a trench prepared

by the dredge and the completion of the lock approaches postponed, owing to the urgent need for the dredging plant for channel improvement at Dams Nos. 5 and 6 and the dredging of the lock approaches at Dam No. 10. Further dredging operations at this locality will probably not be resumed until the winter of 1916-17.

LOCK AND DAM NO. 9.

At the beginning of the year this structure also was in operation and was completed, except dredging of the lock approaches, the concrete walks on Government reservation at lock keeper houses, the erection on the lock of a steel light tower, now under contract, together with some minor constructions details. In view of the existence of reasonably good navigation conditions at this structure and the urgent need for the Government dredging plant at other localities, no dredging operations were conducted during the year. Also, in order to permit the recent filling on lock keeper house reservation to settle, the construction of concrete walks was deferred until this year. A water well was drilled at the esplanade power house and another at lock keeper houses, and three test holes immediately back of land wall of lock for determination of percolation and drainage in the embankment back of lock.

At the beginning of the fiscal year 1917 the Government dredging plant was in readiness for dredging lock approaches at this structure.

When the property for lock-keeper houses was purchased a futile effort was made to secure title also to a small adjoining lot belonging to the B. J. Smith heirs. During the past year purchase of the lot was again attempted, with the result that an agreement with the owners on the basis of \$700 was reached. In order to obtain a satisfactory title an amicable condemnation proceedings was agreed upon, which at the close of the year was reported to be practically concluded by the Department of Justice.

LOCK AND DAM 10.

At the close of the previous year all work under the first general contract for the construction of the lock and dam had been completed. Under various other contracts also the lock gates had been furnished and erected in place, and the gate-recess covers, valve-operating jacks and gearing, lock-gate engines and gate-operating gearing, horses, props, wicket irons, and a part of the timber for Chanoine wickets had been finished and delivered to the structure. Contracts had also been let for a steam-power plant and duplicate turbocompressor plant, a land power house, and a steel-hull maneuver boat for manipulating the Chanoine wickets of the movable dam.

During the year the land power house was completed, the installation of the steam-power plant therein practically completed, the turbocompressor plant in river-wall power house furnished and installed, and the lock-gate recess covers placed by the contractors. A contract was let to Earl N. Everson, Brilliant, Ohio, for two lock-keeper houses, which were completed in May, 1916. Also a contract was let for a weir service bridge and Poiree trestles, on which considerable work was performed, but which at the end

of the year had not been finished. The steel-hull maneuver boat was completed and delivered at the dam in April, 1916.

Under hired-labor operations during the year the lock-gate engines and gate-operating gearing, the valve-operating jacks and piping, and some smaller units pertaining to the steam-power plant were installed. On the bear-trap piers the sector and pinion valve operating devices were removed and worm-gear devices installed. A trench was excavated from the office building at downstream end of the lock grounds to the power and lock-keeper houses and pipe lines for natural gas and city water laid therein. Concrete walks on the esplanade were constructed. On July 19, 1915, the installation of horses and props on the movable-dam foundation was commenced and the steel movable parts completed on September 4. Two hundred and twenty wickets fabricated at the Government saw-mill at Lock No. 4, Monongahela River, arrived at Dam No. 10 on October 15. On the 26th of October they were in place. The office building was converted into a house for occupancy of the dam tender. The conduit under lock chamber was unwatered and pipe connections between land and river-wall power houses installed.

Although neither power plant was ready for operations and the maneuver boat had not yet arrived, the movable dam was raised on October 31 by means of the derrick boat which had accomplished the placing of the movable parts of the dam. After two weeks of satisfactory operations the dam was lowered to permit the contractor to install the turbocompressor plant in river wall of lock. During this period the lock gates were operated with steam furnished by the dredge tender, and the lock was filled and emptied by hand operation of the lock-gate valves.

Dredging of the lock approaches by the Government dredging plant was commenced in October, 1915, and by the close of the fiscal year had been completed. The material consisted of heavy gravel and boulders, with considerable hardpan. Fifty-nine thousand eight hundred and thirty-one cubic yards of materials were removed, of which 17,790 cubic yards were cast over the lower guide wall, filling the space between the wall and the bank, and 42,041 cubic yards were transported in scows to the left shore below the abutment of the dam. Almost continuous high water during the winter and spring interfered more than ordinarily with the dredging operations.

After considerable difficulty arrangements at the end of the year had been completed for securing approximately 1,500 cubic yards of material for topsoiling the gravel esplanade fill in order to provide a lawn at the lock buildings.

In connection with the contracts for furnishing a steel hull maneuver boat for Dam No. 10 similar boats were also included for Dams Nos. 12, 15, 19, and 20 in the Wheeling district, and for Dam No. 29 in the Cincinnati district. The machinery, derricks, etc., for these derrick boats were delivered at Dam No. 1, Ohio River, and there installed on the steel hulls by the operating force at the dam. The boats were completed and shipped to their various destinations in April, 1916.

At the end of the year there remained to be done at this structure the topsoiling of the esplanade fill, some minor machinery installations, and the test operations of both power plants, the delivery and installation of the weir service bridge and Poiree trestles, the erection

on the lock of a steel light tower, and a small amount of riprap stone bank protection below the abutment.

The completion of Lock and Dam No. 10, and the establishment of its pool on October 31, 1915, closed the gap between Dam No. 9 and pool No. 11, in the Wheeling district, heretofore an isolated pool, a distance of 10.1 miles. Including Dam No. 1, Allegheny River, at Pittsburgh, there are now in operation 12 movable dams in consecutive order, furnishing a 9-foot slackwater navigation for a distance of 76.3 miles below the head of the Ohio, and 6.7 miles of 8-foot slackwater in the Allegheny River.

APPROPRIATIONS.

Mar. 3, 1875 (allotment), Davis Island Dam-----	\$100,000.00
June 18, 1878 (allotment), Davis Island Dam-----	125,000.00
Mar. 3, 1879 (allotment), Davis Island Dam-----	100,000.00
June 14, 1880 (allotment), Davis Island Dam-----	100,000.00
Mar. 3, 1881 (allotment), Davis Island Dam-----	150,000.00
Mar. 21, 1882 (appropriation), Davis Island Dam-----	100,000.00
Aug. 2, 1882 (allotment), Davis Island Dam-----	165,000.00
July 5, 1884 (allotment), Davis Island Dam-----	70,000.00
Dec. 9, 1885 (allotment by transfer from Falls of Ohio), Davis Island Dam-----	10,000.00
Aug. 5, 1886 (allotment), Davis Island Dam-----	20,000.00
Aug. 11, 1888 (allotment), drift gap at Davis Island Dam-----	20,000.00
Apr. 18, 1889 (allotment), drift gap at Davis Island Dam-----	7,000.00
June 14, 1889 (allotment), drift gap at Davis Island Dam-----	3,000.00
Dec. 31, 1889 (allotment), drift gap at Davis Island Dam-----	34.01
Sept. 19, 1890, construction of Lock and Dam No. 6-----	250,000.00
July 18, 1892, construction of Lock and Dam No. 6, and purchase of land for No. 2-----	100,000.00
Aug. 18, 1894, construction of Lock and Dam No. 6-----	75,000.00
Mar. 2, 1895, construction of Lock and Dam No. 6-----	150,000.00
June 3, 1896:-----	
Construction of Lock and Dam No. 6-----	25,000.00
Construction of Locks and Dams Nos. 2, 3, 4, and 5, and purchase of sites for Nos. 3, 4, and 5-----	30,000.00
June 4, 1897:-----	
Construction of Dams Nos. 2, 3, and 4-----	400,000.00
Construction of Dam No. 6-----	300,000.00
July 1, 1896, continuing construction of Dams Nos. 2, 3, 4, and 5-----	565,000.00
Mar. 3, 1899, continuing construction of Dams Nos. 2, 3, 4, and 5-----	400,000.00
June 6, 1900, continuing construction of Dams Nos. 2, 3, 4, and 5-----	595,000.00
June 13, 1902:-----	
Continuing construction of Locks and Dams Nos. 2, 3, 4, and 5-----	100,000.00
Completing Lock and Dam No. 6-----	175,000.00
Construction of Lock and Dam No. 7-----	23,000.00
Construction of Lock and Dam No. 8-----	50,000.00
Mar. 3, 1903, continuing construction of Dams Nos. 2, 3, 4, and 5-----	300,000.00
Mar. 3, 1903, construction of Lock and Dam No. 8-----	200,000.00
Apr. 28, 1904, construction of Lock and Dam No. 8-----	50,000.00
Mar. 6, 1905, completion of Locks and Dams Nos. 2, 3, 4, and 5, and modification of said locks and dams and of Lock and Dam No. 6 so as to secure a stage of 9 feet in the pools belonging thereto-----	500,000.00
Mar. 3, 1905, construction of Lock and Dam No. 8-----	80,000.00
June 30, 1906, for continuing improvement by the completion of Locks and Dams Nos. 2, 3, 4, and 5, and the modification of said locks and dams and of Lock and Dam No. 6 so as to secure a stage of 9 feet in the pools belonging thereto-----	1,281,378.00
June 30, 1906, construction of Lock and Dam No. 8-----	80,000.00
Mar. 2, 1907:-----	
Lowering of sill of Lock No. 6-----	70,000.00
Construction of Lock and Dam No. 8-----	251,845.00

May 27, 1908, construction of Lock and Dam No. 8.....	\$138,000.00
Mar. 4, 1909, construction of Lock and Dam No. 8.....	364,000.00
June 25, 1910:	
Locks and Dams Nos. 2, 3, 4, and 5.....	75,000.00
Lock and Dam No. 7 (allotted July 7, 1910).....	150,000.00
Lock and Dam No. 8.....	2,000.00
Lock and Dam No. 9 (allotted July 7, 1910).....	150,000.00
Lock and Dam No. 10 (allotted July 7, 1910).....	40,000.00
Mar. 4, 1911:	
Lock and Dam No. 7 (allotted Apr. 7, 1911).....	350,000.00
Lock and Dam No. 9 (allotted Apr. 7, 1911).....	300,000.00
July 25, 1912:	
Lock and Dam No. 7 (allotted Aug. 17, 1912).....	150,000.00
Lock and Dam No. 9 (allotted Aug. 17, 1912).....	150,000.00
Lock and Dam No. 10 (allotted Aug. 17, 1912).....	470,000.00
Locks and Dams Nos. 7, 9, and 19, for movable parts (allotted Aug. 17, 1912).....	¹ 230,000.00
Aug. 24, 1912:	
Lock and Dam No. 7 (allotted Oct. 4, 1912).....	122,000.00
Lock and Dam No. 9 (allotted Oct. 4, 1912).....	282,000.00
June 23, 1913:	
Lock and Dam No. 7 (allotted July 14, 1913).....	² 300,000.00
Lock and Dam No. 9 (allotted July 14, 1913).....	180,000.00
Aug. 1, 1914, Lock and Dam No. 10 (allotted Aug. 5, 1914).....	500,000.00
Mar. 4, 1915, Lock and Dam No. 10 (allotted Apr. 13, 1915).....	180,000.00
Total appropriated and allotted.....	11,082,255.01
Transferred to Dam No. 39, Ohio River.....	\$10,000.00
Transferred to Dam No. 19, Ohio River.....	30,198.85
	40,198.85
Net total appropriated and allotted.....	11,042,056.16
Receipts from sales and other sources.....	20,878.42
Total receipts from all sources.....	11,062,934.58
Expended on work to June 30, 1916.....	\$10,955,206.89
Balance unexpended July 1, 1916.....	107,727.69
Total.....	11,062,934.58

CONTRACTS IN FORCE.

STEEL LOCK GATES, GATE-RECESS COVERS, AND GATE ENGINE-PIT COVERS FOR DAM No. 10, OHIO RIVER.

Contractor: Independent Bridge Co.

Amount and character of work: \$32,805.40, furnishing and erecting two steel lock gates, covers for two gate recesses, and covers for two gate engine pits, at Dam No. 10, Ohio River.

Rate: Structural steel (lock gates) 5.08 cents per pound; structural steel (recess and engine-pit covers) 1.5 cents per pound; oak timber, \$75 per M.

Date of approval: January 18, 1915.

Date of beginning: February 7, 1915.

Date of expiration: June 25, 1915. (Time extended.)

Completed.

STEEL MANEUVER-BOAT HULLS, STEAMBOAT AND HAND CAPSTANS, DERRICKS, KEVELS, SPUDS, ETC., FOR DAMS NOS. 10, 12, 15, 19, 20, AND 29, OHIO RIVER.

Contractor: Union Foundry & Machine Co.

¹ \$90,000 was for movable parts for No. 19, and of this amount \$80,198.85 was subsequently transferred to Wheeling district.

² Of this amount \$10,000 was transferred to Dam No. 39.

Amount and character of work: \$29,640; furnishing and delivering six steel maneuver-boat hulls, with cabins, complete (lot A), one each for Dams Nos. 10, 12, 15, 19, 20, and 29, Ohio River.

Date of approval: June 4, 1915.

Date of beginning: June 24, 1915.

Date of expiration: October 9, 1915.

Completed.

Contractor: Thomas Carlin's Sons Co.

Amount and character of work: \$3,790; furnishing and delivering two maneuver-boat engines and boilers and two electric light plants (lot B), complete, at Dams 10 and 29, Ohio River.

Date of approval: June 4, 1915.

Date of beginning: June 24, 1915.

Date of expiration: October 9, 1915.

Completed.

Contractor: The Marine Manufacturing & Supply Co.

Amount and character of work: \$3,971; furnishing and installing 6 steam-boat capstans, 6 hand capstans, 84 kevels and chocks, and 36 siphons (lot C) on maneuver boats for Dams Nos. 10, 12, 15, 19, 20, and 29, Ohio River.

Date of approval: June 4, 1915.

Date of beginning: June 24, 1915.

Date of expiration: October 9, 1915.

Completed.

Contractor: J. S. Beckwith.

Amount and character of work: \$2,810; furnishing and delivering 6 stiff-leg derricks, complete, and 18 spuds (lot D) for Dams 10, 12, 15, 19, 20, and 29, Ohio River.

Date of approval: June 11, 1915.

Date of beginning: July 1, 1915.

Date of expiration: October 16, 1915.

Completed.

POWER HOUSE, DAM NO. 10, OHIO RIVER.

Contractor: McFeely Bros.

Amount and character of work: \$18,640; building one fireproof power house at Dam No. 10, Ohio River.

Rate: Power house, complete, \$18,640; extra excavation, \$1.50 per cubic yard; extra concrete, \$11 per cubic yard; extra pipe, 1-inch, 17 cents per linear foot; 1-inch pipe, 18 cents per linear foot; 1-inch pipe, 20 cents per linear foot; 1-inch pipe, 24 cents per linear foot.

Date of approval: June 28, 1915.

Date of beginning: July 11, 1915.

Date of expiration: December 28, 1915.

Completed.

Contractor: E. Keeler Co.

Amount and character of work: \$3,900; furnishing and installing, complete, main boiler and accessories and auxiliary boiler and accessories (lot B) at Dam No. 10, Ohio River.

Rate: Main boiler and accessories, \$2,534; auxiliary boiler and accessories, \$366.

Date of approval: June 29, 1915.

Date of beginning: As soon after date of notification of approval of the contract as conditions at the site will permit.

Date of expiration: Within 60 days after completion of the essential parts of lot A.

Ninety-five per cent completed.

Contractor: Thomas Carlin's Sons Co.

Amount and character of work: \$761.50, furnishing and delivering, complete, boiler feed pump and service pump (lots C and E) at Dam No. 10, Ohio River.

Rate: Boiler feed pump, \$71.50; service pump, \$690.

Date of approval: July 6, 1915.

Date of expiration: Within 90 calendar days after date of receipt of notification that the United States is ready to receive them.
Completed.

Contractor: Dravo-Doyle Co.

Amount and character of work: \$229, furnishing and delivering feed water heater, oil separator, steam separator, and grease trap (lot D), complete, at Dam No. 10, Ohio River.

Date of approval: July 6, 1915.

Date of expiration: Within 90 calendar days after date of receipt of notification that the United States is ready to receive them.
Completed.

Contractor: Chicago Pneumatic Tool Co.

Amount and character of work: \$3,349, furnishing and installing air compressor, receivers, and accessories (lot F), complete, at Dam No. 10, Ohio River.

Date of approval: August 5, 1915.

Date of beginning work: As soon after date of notification of approval of the contract as conditions at the site will permit.

Date of expiration: Within 60 days after completion of the essential parts of lot A.

Ninety-five per cent completed.

Contractor: Iron City Heating Co.

Amount and character of work: \$2,432.70; furnishing and installing piping, etc. (lot G), complete in power house at Dam 10, Ohio River.

Rate: 1/4-inch pipe, 38 cents per linear foot; 1-inch pipe, 53 cents per linear foot; 2-inch pipe, 90 cents per linear foot; 4-inch pipe, \$1.90 per linear foot; 6-inch pipe, \$2.75 per linear foot; 8-inch pipe, \$4.20 per linear foot; standard screw fittings at 70 per cent of Crane's list prices; extra heavy screw fittings at 75 per cent of Crane's list prices; unions at 80 per cent of Lunkenheimer's list prices; standard flanged fittings at 80 per cent of Crane's list price; extra heavy flanged fittings at 66 per cent of Crane's list prices; brass valves at 88 per cent of Lunkenheimer's list prices; cocks at 70 per cent of Lunkenheimer's list prices; standard iron-body valves at 62 per cent of Lunkenheimer's list prices; heavy iron-body valves at 68 per cent of Lunkenheimer's list prices; floor stand, \$29.50; specialties at 140 per cent of net cost.

Date of approval: June 22, 1915.

Date of beginning: As soon after date of notification of approval of contract as conditions at the site will permit.

Date of expiration: Within 60 days after completion of the essential parts of lot A.

Ninety per cent completed.

AIR-COMPRESSOR PLANT, DAM NO. 10, OHIO RIVER.

Contractor: Hall Steam Pump Co.

Amount and character of work: \$5,440, furnishing and installing 2 water turbines, 2 air compressors, 2 sets of bevel-gear drives, and 1 air-driven pressure pump, complete, at Dam No. 10, Ohio River.

Date of approval: July 30, 1915.

Date of beginning work: August 21, 1915.

Date of expiration: November 6, 1915. (Extended.)

Ninety-seven per cent completed.

LOCK KEEPERS' HOUSES, DAM NO. 10, OHIO RIVER.

Contractor: Earl N. Everson.

Amount and character of work: \$11,100; furnishing material and labor and building two brick lock keepers' houses at Dam No. 10, Ohio River.

Date of approval: October 18, 1915.

Date of beginning work: October 30, 1915.

Date of expiration: February 17, 1916. (Extended.)

Completed.

SERVICE BRIDGE AND POIRREE TRETTLES, DAM NO. 10, OHIO RIVER.

Contractor: Independent Bridge Co.

Amount and character of work: \$8,732.52; furnishing all the necessary labor, material, and appliances required and make and deliver service bridge and Poirree trestles at Dam No. 10, Ohio River.

Date of approval: December 2, 1915.

Date of beginning work: December 26, 1915.

Date of expiration: March 6, 1916.

Ninety per cent completed.

LOCKS AND DAMS NOS. 12, 14-17, 19-23, OHIO RIVER.

REPORT OF MAJ. T. H. JACKSON, CORPS OF ENGINEERS

WHEELING, W. VA., DISTRICT.

LOCK AND DAM NO. 12.

First contract.—All work under the general contract with the Foundation Co. for the lock and dam was completed on May 6, 1916.

The following table shows the work accomplished and material delivered under this contract during the fiscal year:

Item.	Designation.	Quantity.	Total cost.
16-foot cofferdam:			
Completed.....	Linear feet.....	1,744.2	\$12,225.40
Pumped out.....	do.....	621.7	6,317.00
Removed.....	do.....	1,831.2	5,493.00
10-foot cofferdam, removed.....	do.....	720.0	1,060.00
Common excavation.....	Cubic yards.....	18,713.0	12,163.45
Fill.....	do.....	5,090.0	2,530.00
Riprap.....	do.....	8,655.0	26,965.00
Stone paving.....	do.....	193.4	1,100.00
Round piles.....	Linear feet.....	17,272.8	8,651.40
Sheet piles.....	M feet b. m.....	102.0217	6,121.30
Common timber.....	do.....	223.3445	11,167.24
Deck timber.....	do.....	93.4000	5,604.00
Oak timber.....	do.....	57.3987	4,391.00
Reinforced concrete.....	Cubic yards.....	60.1	981.00
Concrete.....	do.....	5,741.2	37,317.00
Structural steel.....	Pounds.....	663,650.0	16,255.75
Reinforcing rods.....	do.....	55,989.0	960.00
Forgings.....	do.....	16,461.0	694.25
Bolts.....	do.....	45,142.0	1,576.10
Iron castings.....	do.....	109,086.0	1,603.00
Steel castings.....	do.....	97,971.0	2,180.75
Bronze.....	do.....	1,267.0	466.44
Pipe:			
4-inch.....	Linear feet.....	954.0	1,717.20
3-inch.....	do.....	327.25	490.87
Common labor.....	Hours.....	48.0	12.00
Skilled labor.....	do.....	27.0	12.80

Lock gates.—The contractor delivered and erected the lock gates, and the gates were painted by hired labor.

Movable parts.—The service bridge, the trestles and aprons, and the horses and props were built by contract and delivered.

Water-power plant.—Contracts were entered into for the water turbines and air compressors, but no deliveries were made.

Gate-operating machinery.—Contracts were entered into for the gate engines and gate winches, but no deliveries were made.

Valve-operating machinery.—A contract was entered into for the river-wall valve jacks, but no deliveries were made.

Gate recess and engine pit covers.—The contract for this material was completed. The covers were placed by hired labor and were painted.

Maneuver boat.—This boat, contracted for by the Pittsburgh office, was delivered.

Dredging.—About 85,000 cubic yards of material were dredged from the approaches to the lock by the dredging fleet under the supervision of the first Cincinnati district.

Signal-light towers.—A steel signal-light tower was erected by hired labor at each end of the river wall.

LOCK AND DAM NO. 14.

First contract.—Work was continued under the general contract with the Missouri Valley Bridge & Iron Co., Leavenworth, Kans., for the lock and dam proper, and the following was accomplished: The bear traps, Piers Nos. 1, 2, and 85 per cent of No. 3, 70 per cent of the foundation for the Chanoine Weir, 85 per cent of the abutment, 44 per cent of the foundation for the pass, 32 per cent of the lower guide wall were constructed, and 94 per cent of the esplanade was paved.

The following table shows the work accomplished and material delivered under this contract during the fiscal year:

Item.	Designation.	Quantity.	Total cost.
16-foot cofferdam:			
Pumped out.....	Linear feet.....	691.0	\$8,879.35
Completed.....	do.....	1,978.3	17,794.81
Removed.....	do.....	1,978.3	7,626.35
10-foot cofferdam:			
Pumped out.....	do.....	788.0	4,056.00
Removed.....	do.....	39.5	65.18
Common excavation.....	Cubic yards.....	28,300.0	16,890.00
Rock excavation.....	do.....	1,052.0	2,690.00
Fill.....	do.....	8,000.0	3,260.00
Riprap.....	do.....	1,428.22	3,570.55
Round piles.....	Linear feet.....	3,853.0	1,926.50
Sheet piles.....	M feet b. m.....	68.6628	4,806.40
Oak timber.....	do.....	59.74	5,974.00
Concrete.....	Cubic yards.....	25,109.77	135,592.76
Concrete paving.....	do.....	1,498.0	11,235.00
Structural steel, in place.....	Pounds.....	657,981.0	19,739.43
Reinforcing rods, in place.....	do.....	4,011.0	64.18
Reinforcing rods, delivered only.....	do.....	1,681.0	40.34
Forgings, in place.....	do.....	22,424.0	627.87
Bolts, etc., delivered only.....	do.....	147.0	5.29
Bolts, etc., in place.....	do.....	24,183.0	580.39
Iron castings, in place.....	do.....	136,610.0	3,005.42
Steel castings, in place.....	do.....	129,446.0	4,401.16
Bronze, in place.....	do.....	1,312.0	393.60
Pipe:			
6-inch.....	Linear feet.....	144.6	361.80
4-inch.....	do.....	1,681.5	3,363.09
3-inch.....	do.....	1,360.1	2,040.15
24-inch.....	do.....	18.7	22.44
2-inch.....	do.....	557.8	557.80
Common labor.....	Hours.....	474.0	118.50
Skilled labor.....	do.....	189.5	344.75
Extra material.....	do.....	do.....	442.76

Lock gates.—A contract for the lock gates was entered into, and shopwork is in progress.

Movable parts.—A contract for the horses and props was entered into, but no deliveries were made. About 90 per cent of the pass and weir wickets were built by hired labor at Dam No. 22, but no deliveries were made at the site.

Power house.—A contract for the land power house was entered into, and the following was accomplished: Completed the foundation walls, the chimney and machinery foundations, the concrete well and coal pocket, the basement plumbing and drains, and placed the first-floor steel and basement sash.

Water-power plant.—Contracts were entered into for the water turbines and the air compressors, but no deliveries were made.

Gate-operating machinery.—Contracts were entered into for the gate engines and the gate winches, but no deliveries were made.

Valve-operating machinery.—A contract was entered into for the river-wall valve jacks, but no deliveries were made.

Gate-recess and engine-pit covers.—A contract for this material was entered into, but no deliveries were made.

Maneuver boat.—A contract was entered into for this boat, and work is in progress.

LOCK AND DAM NO. 15.

At the close of the fiscal year this lock and dam was practically completed and ready to be in operation on July 1, 1916.

Lock gates.—The lock gates were erected by contract.

Movable parts.—Completed the installation of wickets and horses for the pass.

Water-power plant.—This machinery was purchased by contract and was installed by hired labor.

Gate-operating machinery.—This machinery was purchased by contract and was installed by hired labor.

Valve-operating machinery.—The river-wall valve jacks purchased by contract were delivered and were placed by hired labor.

Signal-light towers.—A steel signal-light tower was erected by hired labor at each end of the river wall.

Maneuver boat.—This boat, contracted for by the Pittsburgh office, was delivered.

LOCK AND DAM NO. 16.

First contract.—All work under the general contract for the lock and dam with the T. A. Gillespie Co., Pittsburgh, Pa., was completed on December 31, 1915, or 2 years 4 months and 18 days after the date of approval of the contract. This is the shortest period within which the work of constructing an Ohio River lock and dam involved in the first general contract has been finished.

The following table shows the work accomplished and material delivered under this contract during the fiscal year:

Item.	Designation.	Quantity.	Total cost.
16-foot cofferdam:			
Pumped out.....	Linear feet.....	2,872	\$46,670.00
Completed.....	do.....	1,186	7,412.50
Removed.....	do.....	2,798.4	6,996.00
10-foot cofferdam:			
Completed.....	do.....	830	2,593.75
Removed.....	do.....	1,244	1,555.00
Common excavation.....	Cubic yards.....	97,488	77,990.40
Rock excavation.....	do.....	1,904	7,616.00
Rock channeling.....	Square feet.....	4,250	2,129.50
Fill.....	Cubic yards.....	8,941	5,364.60
Riprap.....	do.....	1,898	6,643.00
Oak timber.....	Linear feet.....	58,406	7,884.68
Concrete.....	Cubic yards.....	21,935	132,706.75
Concrete paving.....	do.....	2,190	16,492.50
Structural steel:			
In place.....	Pounds.....	676,808	18,950.62
Delivered only.....	do.....	2,198	92.32
Reinforcing rods:			
In place.....	do.....	2,436	48.72
Delivered only.....	do.....	2,436	73.08
Forgings:			
In place.....	do.....	29,199	817.57
Delivered only.....	do.....	25,532	1,064.94
Bolts, etc.:			
In place.....	do.....	23,423	655.84
Delivered only.....	do.....	31,960	1,342.32
Iron castings:			
In place.....	do.....	109,612	2,192.24
Delivered only.....	do.....	170,228	5,106.84
Steel castings, in place.....	do.....	124,191	4,967.64
Brass, in place.....	do.....	1,312	524.80
Pipe:			
4-inch—			
In place.....	Linear feet.....	860.50	521.70
Delivered only.....	do.....	1,117.75	1,005.98
3-inch—			
In place.....	do.....	624.20	374.52
Delivered only.....	do.....	563.45	507.11
Skilled labor.....	Hours.....	214	107.00
Extra material.....			771.22

Lock gates.—A contract for the mitering lock gates was entered into on February 29, 1916, and about 2 per cent of the shop work is completed.

Movable parts.—A contract was entered into for the horses and props, but no deliveries were made. The pass and weir wickets were built by hired labor at Dam No. 22, Ohio River, and were delivered at the site, but not placed.

Power house.—A contract for the land power house was entered into. About 85 per cent of the excavation and 69 per cent of the concrete walls are completed.

Lock-operating machinery.—A contract for the river-wall valve jacks was entered into, but no deliveries were made.

Maneuver boat.—This boat is being built by contract and is about 5 per cent completed.

LOCK AND DAM NO. 17.

First contract.—All work under the general contract with the T. A. Gillespie Co., Pittsburgh, Pa., for the lock and dam was completed on February 29, 1916, or 2 years 6 months and 14 days after the date of approval of the contract.

The following table shows the work accomplished and material delivered under this contract during the fiscal year:

Item.	Designation.	Quantity.	Total cost.
16-foot cofferdam:			
Pumped out.....	Linear feet.....	960	\$15,600.00
Completed.....	do.....	2,806	17,531.25
Removed.....	do.....	2,906	7,262.50
10-foot cofferdam removed.....	do.....	1,142	1,427.50
Common excavation.....	Cubic yards.....	23,413	16,389.10
Rock excavation.....	do.....	531.6	2,126.40
Rock channeling.....	Square feet.....	6,500.3	3,250.15
Fill.....	Cubic yards.....	13,793.3	8,275.98
Riprap.....	do.....	1,592	5,572.00
Oak timber.....	M feet b. m.....	66.781	9,015.44
Reinforced concrete.....	Cubic yards.....	1.8	21.00
Concrete.....	do.....	34,061.4	304,308.40
Concrete paving.....	do.....	1,772.6	13,204.50
Steel, iron, and bronze:			
In place.....	Pounds.....	1,117,240.5	22,080.95
Delivered only.....	do.....	16,812.5	682.33
Pipe in place.....	Linear feet.....	3,648.7	1,465.11
Tile drain.....	do.....	54	27.00
Common labor.....	Hours.....	261	65.24
Skilled labor.....	do.....	206	148.00
<i>Under supplemental contract dated Aug. 26, 1914.</i>			
Pipe, placed only.....	Linear feet.....	1,546.8	1,792.89
Structural steel, forgings, bolts, and iron castings.....	Pounds.....	11,321	689.24
Extra material.....			738.97

Lock gates.—A contract for the mitering lock gates was entered into on February 29, 1916, and about 2 per cent of the shop work is completed.

Movable parts.—The horses and props are being built under contract, and about 20 per cent of the shop work is completed. The pass and weir wickets were built by hired labor at Dam No. 22, Ohio River, and were delivered at the site, but not placed.

Power house.—A contract for the land power house was entered into on March 9, 1916, and the excavation, concrete walls, and about 20 per cent of the structural steel were completed.

Lock-operating machinery.—A contract for the river-wall valve jacks was entered into, but no deliveries were made.

Maneuver boat.—This boat is being built by contract, and is about 5 per cent completed.

LOCK AND DAM NO. 19.

The work of reinforcing the navigable pass was continued by hired labor with Government plant; 168 linear feet of the pass adjacent to Pier No. 1 was reinforced with anchor bolts and 332 linear feet was strengthened by the addition of a key at the downstream edge.

The following table shows the work accomplished and material delivered during the fiscal year:

Item.	Designation.	Quantity.
10-foot cofferdam:		
Completed.....	Linear feet.....	1,154
Removed.....	do.....	579
Common excavation:		
Pass.....	Cubic yards.....	5,125
Approach.....	do.....	11,060
Rock excavation.....	do.....	322
Bolt holes.....	Linear feet.....	963
Channelled key.....	Square feet.....	2,986
Concrete.....	Cubic yards.....	62
Pass horses and props, in place.....	Number.....	62
Wickets, pass, in place.....	do.....	12,481
Steel and iron.....	Pounds.....	

Movable parts.—Placed 82 horses, props, and wickets in the pass by hired labor.

Water-power plant.—The air compressors and water turbines were purchased by contract and installed by hired labor, but the piping was not installed.

Gate-operating machinery.—The gate engines and gate winches, purchased by contract, were delivered, but not installed.

Valve-operating machinery.—The river-wall valve jacks were purchased by contract and installed by hired labor, but the piping was not installed.

Maneuver boat.—This boat, contracted for by the Pittsburgh office, was delivered.

LOCK AND DAM NO. 20.

First contract.—All work under the general contract with the Sheridan-Kirk Contract Co. for the lock and dam was completed on February 9, 1916.

The following table shows the work accomplished and material delivered under this contract during the fiscal year:

Item.	Designation.	Quantity.	Total cost.
16-foot cofferdam:			
Completed.....	Linear feet.....	990	\$6,923.00
Removed.....	do.....	1,419	4,287.00
10-foot cofferdam, removed.....	do.....	290	217.50
Common excavation.....	Cubic yards.....	7,353	4,411.80
Rock excavation.....	do.....	688	688.00
Fill.....	do.....	934	373.60
Riprap.....	do.....	1,929	5,787.00
Oak timber.....	Feet b. m.....	59,085	4,726.80
Reinforced concrete.....	Cubic yards.....	61	732.00
Concrete.....	do.....	11,142	62,506.62
Concrete paving.....	do.....	671	5,186.83
Structural steel, in place.....	Pounds.....	648,581	16,863.11
Reinforcing rods, in place.....	do.....	13,571	297.37
Forgings:			
In place.....	do.....	21,143	490.52
Delivered only.....	do.....	342	11.90
Bolts, etc., in place.....	do.....	26,811	589.84
Iron castings, in place.....	do.....	80,267	1,765.88
Steel castings, in place.....	do.....	107,483	4,213.33
Bronze, in place.....	do.....	1,314	446.76
Pipe:			
4-inch.....	Linear feet.....	1,116	1,227.60
3-inch.....	do.....	657	505.89
Common laborer.....	Hours.....	26	6.50
Skilled labor.....	do.....	171	85.50
Rock channeling.....	Square feet.....	1,966	1,966.00
Drilling bolt holes.....	Linear feet.....	163	97.80
Extra material.....			182.72

Lock gates.—The contractor for the lock gates delivered the material at the site, erected the upper gate, and 84 per cent of the lower gate.

Movable parts.—The service bridge trestles and aprons and the horses and props, built by contract, were delivered at the site, and the service bridge was placed.

Water-power plant.—Contracts were entered into for the water turbines and air compressors, but no deliveries were made.

Gate-operating machinery.—Contracts were entered into for the gate engines and the gate winches, but no deliveries were made.

Valve-operating machinery.—A contract was entered into for the river-wall valve jacks, but no deliveries were made.

Gate recess and engine pit covers.—The contract for this material was completed.

Maneuver boat.—This boat, contracted for by the Pittsburgh office, was delivered.

LOCK AND DAM NO. 21.

Work was continued on the construction of this lock and dam by hired labor with Government plant. During the year 348 linear feet of pass foundation was completed.

The following table shows the work accomplished and material delivered during the fiscal year:

Item.	Designation.	Quantity.
18-foot cofferdam:		
Pumped out.....	Linear feet.....	1,556.0
Completed.....	do.....	1,556.0
Removed.....	do.....	1,556.0
Common excavation.....	Cubic yards.....	9,448.0
Rock excavation.....	do.....	302.0
Rock channeling.....	Square feet.....	1,362.0
Oak timber:		
In place.....	Feet b. m.....	4,056.0
Delivered only.....	do.....	29,064.0
Concrete.....	Cubic yards.....	4,995.0
Structural steel:		
In place.....	Pounds.....	21,756.0
Delivered only.....	do.....	112,226.7
Reinforcing rods in place.....	do.....	1,747.0
Forgings:		
In place.....	do.....	2,851.0
Delivered only.....	do.....	29,082.7
Bolts, etc.:		
In place.....	do.....	1,874.0
Delivered only.....	do.....	23,728.0
Iron castings:		
In place.....	do.....	76,551.0
Delivered only.....	do.....	230,009.6
Steel castings:		
In place.....	do.....	27,006.5
Delivered only.....	do.....	151,172.0
Bronze, delivered only.....	do.....	145.0
Pipe, 2-inch:		
In place.....	Linear feet.....	348.0
Delivered only.....	do.....	1,210.0

Installed a cableway for handling materials; erected a sawmill, electric-light plant, and a storehouse; built a derrick boat, a pump boat, a sand digger, and four sand and gravel barges.

LOCK AND DAM NO. 22.

Work was continued on the construction of this lock and dam by hired labor with Government plant. During the year the cofferdam was completed around the lock and 200 linear feet of the pass. The following work was completed within this cofferdam: The entire land wall, 2.6 per cent of the upper guide wall, 4.5 per cent of the river wall, 60 per cent of the fill behind the land wall, and about 90 per cent of the excavation for the river wall, miter sills, and pass section.

The following table shows the work accomplished and material delivered during the fiscal year:

Item.	Designation.	Quantity.
18-foot cofferdam, pumped out.....	Linear feet....	1,804
Common excavation.....	Cubic yards....	20,100
Fill.....	do.....	12,000
Rock excavation.....	do.....	343
Rock channeling.....	Square feet....	2,431
Concrete.....	Cubic yards....	11,464
Structural steel:		
In place.....	Pounds.....	29,380
Delivered only.....	do.....	241,343
Forgings:		
In place.....	do.....	5,188
Delivered only.....	do.....	354,977
Bolts, etc., delivered only.....	do.....	13,002
Reinforcing rods:		
In place.....	do.....	1,149
Delivered only.....	do.....	3,530
Iron castings:		
In place.....	do.....	883
Delivered only.....	do.....	150,241
Steel castings, delivered only.....	do.....	63,631
Pipe:		
6-inch, delivered only.....	Linear feet....	1,954
4-inch—		
In place.....	do.....	100
Delivered only.....	do.....	1,880
3-inch, delivered only.....	do.....	978
2-inch, delivered only.....	do.....	854
1½-inch, delivered only.....	do.....	441
1¼-inch, delivered only.....	do.....	768

Installed a cableway for handling materials, built the pass and weir wickets for Dams Nos. 14, 16, and 17; built the hulls for mixer boat, gasoline towboat, 2 sand and gravel barges, and 2 cement barges for Dam No. 21; installed the machinery on a derrick boat and a pump boat.

LOCK AND DAM NO. 23.

No funds have been provided for construction work. During the month of June 7 test wells were driven on the proposed site of the lock and guide walls, for the purpose of securing accurate information concerning subsurface conditions. This work was done by hired labor with Government plant.

LOCK AND DAM NO. 24.

First contract.—Work was continued under the general contract with the Sheridan-Kirk Contract Co. for the lock and dam proper, and the following was accomplished: Constructed 10 per cent of the river wall, 73 per cent of the upper gate track, the upper guide wall, and the lower gate track.

The following table shows the work accomplished and material delivered under this contract during the fiscal year:

Item.	Designation.	Quantity.	Total cost.
16-foot cofferdam:			
Completed.....	Linear feet.....	1,376	\$8,600.00
Removed.....	do.....	1,376	3,440.00
10-foot cofferdam:			
Completed.....	do.....	643	2,411.25
Removed.....	do.....	643	964.50
Common excavation.....	Cubic yards.....	21,000	14,700.00
Rock excavation.....	do.....	1,100	3,938.00
Rock channelling.....	Square feet.....	2,150	1,200.00
Drilling bolt holes.....	Linear feet.....	294	102.90
Fill.....	Cubic yards.....	1,500	900.00
Oak timber.....	M feet b. m.....	0.8	80.00
Reinforced concrete.....	Cubic yards.....	96	1,470.00
Concrete.....	do.....	8,480	54,925.00
Concrete paving.....	do.....	750	5,250.00
Structural steel:			
Placed only.....	Pounds.....	92,613	2,898.15
Delivered only.....	do.....	221	9.25
Reinforcing rods:			
In place.....	do.....	8,928	282.00
Delivered only.....	do.....	15,528	625.50
Forgings in place.....	do.....	6,075	192.25
Bolts, etc.:			
In place.....	do.....	5,788	189.40
Delivered only.....	do.....	3,986	155.43
Iron castings:			
In place.....	do.....	4,604	120.84
Delivered only.....	do.....	143	5.35
Steel castings in place.....	do.....	7,149	214.85
Tile drain.....	Linear feet.....	163	208.75

Miscellaneous.—A hired labor force constructed 1,136 square feet of concrete walk, erected a wire fence around the lock houses, and laid 300 linear feet of sewer pipe.

LOCK AND DAM NO. 25.

No funds have been provided for construction. A drill party was fitted out for the purpose of making core borings to obtain more accurate information concerning subsurface conditions at the site of the proposed lock and dam. No work was done at the site.

LOCK AND DAM NO. 26.

The work of constructing this lock and dam by hired labor with Government plant was completed during the year. An electric-light outfit for the power house and lock keepers' houses was installed, and a steel signal light tower was erected at each end of the river wall.

LOCK AND DAM NO. 27.

No funds have been provided for construction work. A small allotment of funds was made for the purpose of making core borings to obtain more accurate information concerning subsurface conditions at the site of the proposed lock and dam, but no work was done at Dam No. 27.

LOCK AND DAM NO. 28.

The work of constructing this lock and dam by hired labor with Government plant was completed during the year. A steel signal light tower was erected at the ends of the river wall; the buildings were wired, and an electric lighting outfit was installed; concrete walks

and gutters and tile drains were built; and the installation of the machinery in the river-wall power house was completed.

APPROPRIATIONS.

DAM NO. 11.

June 13, 1902 (allotted June 20, 1902)	\$50,000.00	
Mar. 3, 1903 (allotted Mar. 11, 1903)	200,000.00	
Apr. 28, 1904 (allotted May 3, 1904)	50,000.00	
Mar. 3, 1905 (allotted Mar. 14, 1905)	80,000.00	
June 30, 1906 (allotted July 7, 1906)	80,000.00	
Mar. 2, 1907 (allotted Mar. 7, 1907)	188,843.00	
May 27, 1908 (allotted June 6, 1908)	200,000.00	
Mar. 4, 1909 (allotted Mar. 12, 1909)	800,000.00	
June 25, 1910 (allotted July 2, 1910)	48,000.00	
		\$1,206,843.00
Transferred to Dam No. 28, July 14, 1914	25,000.00	
Transferred to Dam No. 28, July 15, 1914	19,178.30	
		44,178.30
Net total appropriated and allotted		1,162,164.70
Receipts from sales and other sources		59.25
Grand total of receipts from all sources		1,162,223.95
Expended on work to June 30, 1916		1,162,223.95

DAM NO. 12.

June 25, 1910 (allotted July 7, 1910)	\$150,000.00	
Mar. 4, 1911 (allotted Apr. 7, 1911)	300,000.00	
June 23, 1913 (allotted July 14, 1913)	277,000.00	
Aug. 1, 1914 (allotted Aug. 5, 1914)	385,000.00	
Oct. 2, 1914 (allotted Oct. 14, 1914)	12,000.00	
Mar. 3, 1915 (allotted Mar. 15, 1915)	49,000.00	
Mar. 4, 1915 (allotted Apr. 18, 1915)	125,000.00	
		\$1,298,000.00
Transferred to Dam No. 26, July 7, 1914	30,000.00	
Transferred to Dam No. 28, July 7, 1914	50,000.00	
Transferred to Dam No. 15, Aug. 5, 1914	35,000.00	
		115,000.00
Net total appropriated and allotted		1,183,000.00
Receipts from sales and other sources		963.80
Grand total of receipts from all sources		1,183,963.80
Expended on work to June 30, 1916	1,123,667.87	
Balance unexpended July 1, 1916	60,296.43	
		1,183,963.80

DAM NO. 13.

Mar. 3, 1899 (allotted Mar. 10, 1899)	\$50,000.00	
June 6, 1900 (allotted June 12, 1900)	235,000.00	
Mar. 3, 1901 (allotted Mar. 11, 1901)	20,000.00	
June 28, 1902 (allotted July 10, 1902)	46,600.00	
Mar. 3, 1903 (allotted Mar. 11, 1903)	225,000.00	
Mar. 3, 1905 (allotted Mar. 9, 1905)	50,000.00	
June 30, 1906 (allotted July 7, 1906)	85,400.00	
Mar. 2, 1907 (allotted Mar. 9, 1907)	174,778.00	
Mar. 4, 1907 (allotted Mar. 9, 1907)	100,000.00	
Mar. 4, 1907 (allotted Sept. 22, 1908)	6,000.00	
May 27, 1908 (allotted June 6, 1908)	60,000.00	
Mar. 4, 1909 (allotted Mar. 12, 1909)	160,000.00	
June 25, 1910 (allotted July 6, 1910)	50,000.00	
		\$1,262,778.00

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Transferred to Dam No. 18, Mar. 11, 1910-----	\$20,000.00	
Transferred to Dam No. 18, Dec. 23, 1910-----	5,000.00	
Transferred to Dam No. 28, July 15, 1914-----	15,388.89	
		\$40,388.89
Net total appropriated and allotted-----		1,222,889.11
Receipts from sales and other sources-----		141.42
Grand total of receipts from all sources-----		1,222,530.53
Expended on work to June 30, 1916-----		1,222,530.53

DAM NO. 14.

Feb. 27, 1911 (allotted Apr. 7, 1911)-----	\$380,000.00	
July 25, 1912 (allotted Oct. 4, 1912)-----	100,000.00	
June 23, 1913 (allotted July 14, 1913)-----	200,000.00	
Aug. 1, 1914 (allotted Aug. 5, 1914)-----	175,000.00	
Mar. 3, 1915 (allotted Mar. 15, 1915)-----	200,000.00	
Mar. 4, 1915 (allotted July 2, 1915)-----	182,000.00	
June 23, 1913 (allotted Dec. 15, 1915)-----	20,000.00	
June 23, 1913 (allotted Jan. 29, 1916)-----	6,328.28	
Oct. 2, 1914 (allotted Jan. 29, 1916)-----	19,000.00	
		\$1,232,326.26
Transferred to Dam No. 28, June 14, 1911-----	50,000.00	
Transferred to Dam No. 15, Aug. 5, 1914-----	48,000.00	
		98,000.00
Net total appropriated and allotted-----		1,134,326.26
Receipts from sales and other sources-----		742.06
Grand total of receipts from all sources-----		1,135,068.32
Expended on work to June 30, 1916-----	905,024.32	
Balance unexpended July 1, 1916-----	230,044.00	
		1,135,068.32

DAM NO. 15.

Feb. 27, 1911 (allotted Apr. 7, 1911)-----	\$355,000.00	
July 25, 1912 (allotted Oct. 4, 1912)-----	150,000.00	
June 23, 1913 (allotted July 14, 1913)-----	200,000.00	
Mar. 4, 1911 (allotted Mar. 10, 1914)-----	75,000.00	
Mar. 4, 1913 (allotted Aug. 5, 1914)-----	37,000.00	
June 23, 1913 (allotted Aug. 5, 1914)-----	83,000.00	
Aug. 1, 1914 (allotted Aug. 5, 1914)-----	304,000.00	
Oct. 2, 1914 (allotted Oct. 14, 1914)-----	50,000.00	
June 25, 1910 (allotted Oct. 28, 1915)-----	1,038.24	
		\$1,255,038.24
Transferred to Dam No. 28, June 14, 1911-----	50,000.00	
Transferred to Dam No. 19, Mar. 5, 1915-----	50,000.00	
		100,000.00
Net total appropriated and allotted-----		1,155,038.24
Receipts from sales and other sources-----		761.50
Grand total of receipts from all sources-----		1,155,799.74
Expended on work to June 30, 1916-----	1,147,256.01	
Balance unexpended July 1, 1916-----	8,543.73	
		1,155,799.74

DAM NO. 16.

Mar. 4, 1913 (allotted June 12, 1913)-----	\$371,400.00	
Aug. 1, 1914 (allotted Aug. 5, 1914)-----	231,000.00	
Mar. 3, 1915 (allotted Mar. 15, 1915)-----	511,000.00	
Mar. 4, 1915 (allotted Apr. 13, 1915)-----	150,000.00	
		\$1,263,400.00

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Transferred to Dam. No. 39, Aug. 5, 1914-----	\$40,000.00
Net total appropriated and allotted-----	1,223,400.00
Receipts from sales and other sources-----	74.55
Grand total of receipts from all sources-----	1,223,474.55
Expended on work to June 30, 1916-----	\$1,041,849.82
Balance unexpended July 1, 1916-----	181,624.73
	1,223,474.55

DAM NO. 17.

Mar. 4, 1913 (allotted June 12, 1913)-----	\$364,500.00
Aug. 1, 1914 (allotted Aug. 5, 1914)-----	325,000.00
Mar. 3, 1915 (allotted Mar. 15, 1915)-----	532,000.00
Mar. 4, 1915 (allotted July 2, 1915)-----	143,000.00
Mar. 4, 1915 (allotted Jan. 29, 1916)-----	50,000.00
July 27, 1916 (allotted Aug. 1, 1916)-----	6,000.00
	\$1,420,500.00
Transferred to Dam No. 24, Aug. 13, 1913-----	20,000.00
Transferred to Dam No. 15, Aug. 5, 1914-----	37,000.00
Transferred to Dam No. 39, Aug. 5, 1914-----	40,000.00
	97,000.00
Net total appropriated and allotted-----	1,323,500.00
Receipts from sales and other sources-----	69.50
Grand total of receipts from all sources-----	1,323,569.50
Expended on work to June 30, 1916-----	\$1,189,981.85
Balance unexpended July 1, 1916-----	177,587.65
Appropriated since July 1, 1916-----	6,000.00
	1,323,569.50

DAM NO. 18.

Mar. 3, 1899 (allotted Mar. 10, 1899)-----	\$50,000.00
June 6, 1900 (allotted June 12, 1900)-----	235,000.00
Mar. 3, 1901 (allotted Mar. 11, 1901)-----	20,000.00
Mar. 3, 1903 (allotted Mar. 11, 1903)-----	225,000.00
Mar. 3, 1905 (allotted Mar. 9, 1905)-----	50,000.00
June 30, 1906 (allotted July 7, 1906)-----	75,000.00
Mar. 4, 1907 (allotted Mar. 9, 1907)-----	178,000.00
Mar. 4, 1909 (allotted Mar. 12, 1909)-----	60,000.00
Mar. 4, 1909 (allotted Mar. 11, 1910)-----	20,000.00
June 25, 1910 (allotted Dec. 28, 1910)-----	5,000.00
	\$918,000.00
Transferred to Dam No. 15, Oct. 28, 1915-----	1,038.24
Transferred to Dam No. 13, Sept. 22, 1908-----	6,000.00
	7,038.24
Net total appropriated and allotted-----	910,961.76
Receipts from sales and other sources-----	2,016.69
Grand total of receipts from all sources-----	912,978.45
Expended on work to June 30, 1916-----	912,978.45

DAM NO. 19.

June 13, 1902 (allotted June 20, 1902)-----	\$25,000.00
Mar. 3, 1905 (allotted Mar. 14, 1905)-----	100,000.00
Mar. 3, 1907 (repealed by river and harbor act)-----	100,000.00
	25,000.00

¹ This amount includes \$33.09 reimbursable and unsettled.

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Mar. 2, 1907 (allotted Mar. 9, 1907)-----	\$200,000.00
June 25, 1910 (allotted July 7, 1910)-----	220,000.00
Mar. 4, 1911 (allotted Apr. 7, 1911)-----	300,000.00
July 25, 1912 (allotted Aug. 17, 1912)-----	100,000.00
July 25, 1912 (allotted Aug. 17, 1912)-----	¹ 30,198.85
June 23, 1913 (allotted July 14, 1913)-----	50,000.00
June 23, 1913 (allotted Aug. 5, 1914)-----	17,000.00
Aug. 1, 1914 (allotted Aug. 5, 1914)-----	140,000.00
Oct. 2, 1914 (allotted Oct. 14, 1914)-----	48,000.00
Oct. 2, 1914 (allotted Mar. 5, 1915)-----	50,000.00

Net total appropriated and allotted-----	\$1,180,198.85
Receipts from sales and other sources-----	1,047.52

Grand total of receipts from all sources-----	1,181,246.37
Expended on work to June 30, 1916-----	1,128,829.37
Balance unexpended July 1, 1916-----	54,417.00
	<u>1,181,246.37</u>

DAM NO. 20.

June 25, 1910 (allotted July 7, 1910)-----	\$40,000.00
Feb. 27, 1911 (allotted Apr. 7, 1911)-----	298,000.00
Aug. 24, 1912 (allotted Oct. 4, 1912)-----	187,000.00
June 23, 1913 (allotted July 14, 1913)-----	200,000.00
Aug. 1, 1914 (allotted Aug. 5, 1914)-----	145,000.00
Oct. 2, 1914 (allotted Oct. 14, 1914)-----	12,000.00
Mar. 3, 1915 (allotted Mar. 15, 1915)-----	57,000.00
Mar. 4, 1915 (allotted Apr. 13, 1915)-----	100,000.00
	<u>\$1,019,000.00</u>

Transferred to Dam No. 28, June 14, 1911-----	50,000.00
Transferred to Dam No. 19, Aug. 5, 1914-----	17,000.00
	<u>67,000.00</u>

Net total appropriated and allotted-----	952,000.00
Receipts from sales and other sources-----	730.96

Grand total of receipts from all sources-----	952,730.96
Expended on work to June 30, 1916-----	904,870.15
Balance unexpended July 1, 1916-----	47,860.81
	<u>952,730.96</u>

DAM NO. 21.

Oct. 2, 1914 (allotted Oct. 14, 1914)-----	\$65,000.00
Mar. 4, 1915 (allotted Apr. 13, 1915)-----	400,000.00
July 27, 1916 (allotted Aug. 1, 1916)-----	215,000.00
	<u>\$680,000.00</u>
Transferred to Dam No. 17, Jan. 29, 1916-----	50,000.00

Net total appropriated and allotted-----	630,000.00
Receipts from sales and other sources-----	155.93

Grand total of receipts from all sources-----	630,155.93
Expended on work to June 30, 1916-----	815,608.06
Balance unexpended July 1, 1916-----	99,547.87
Appropriated since July 1, 1916-----	215,000.00
	<u>630,155.93</u>

DAM NO. 22

Oct. 2, 1914 (allotted Oct. 14, 1914)-----	\$65,000.00
Mar. 4, 1915 (allotted Apr. 13, 1915)-----	400,000.00
July 27, 1916 (allotted Aug. 1, 1916)-----	250,000.00
	<u>\$715,000.00</u>

¹\$90,000 was allotted to the Pittsburgh, Pa., district for movable parts of Dam No. 19. This amount (\$30,198.85) represents the unexpended balance transferred to this district Oct. 9, 1915.

CONSTRUCTION OF LOCKS AND DAMS ON THE OHIO RIVER. 2753

Transferred to Dam No. 23, Mar. 15, 1916.....	\$2,000.00	
Transferred to Dam No. 25, Mar. 15, 1916.....	2,000.00	
Transferred to Dam No. 27, Mar. 15, 1916.....	2,000.00	
		\$6,000.00

Net total appropriated and allotted		709,000.00
Receipts from sales and other sources		4.00

Grand total of receipts from all sources		709,004.00
Expended on work to June 30, 1916.....	842,487.42	
Balance unexpended July 1, 1916.....	¹ 116,538.58	
Appropriated since July 1, 1916.....	250,000.00	
		709,004.00

DAM NO. 23.

Mar. 4, 1915 (allotted Mar. 15, 1916)	\$2,000.00	
July 27 1916 (allotted Aug. 1, 1916)	600,000.00	
Net total appropriated and allotted		602,000.00
Expended on work to June 30, 1916.....	1,297.91	
Balance unexpended July 1, 1916.....	702.09	
Appropriated since July 1, 1916.....	600,000.00	
		602,000.00

DAM NO. 24.

Mar. 4, 1913 (allotted June 12, 1913)	\$300,000.00	
Mar. 4, 1913 (allotted Aug. 13, 1913)	20,000.00	
Aug. 1, 1914 (allotted Aug. 5, 1914)	280,000.00	
Mar. 8, 1915 (allotted Mar. 15, 1915)	386,000.00	
July 27, 1916 (allotted Aug. 1, 1916)	158,500.00	
		\$1,102,500.00
Transferred to Dam No. 28, Aug 5, 1914		50,000.00
Net total appropriated and allotted		1,052,500.00
Receipts from sales and other sources		30.20
Grand total of receipts from all sources		1,052,530.20
Expended on work to June 30, 1916.....	490,334.52	
Balance unexpended July 1, 1916.....	465,695.68	
Appropriated since July 1, 1916.....	158,500.00	
		1,052,530.20

DAM NO. 25.

Mar. 4, 1915 (allotted Mar. 15, 1916)	\$2,000.00	
July 27, 1916 (allotted Aug. 1, 1916)	600,000.00	
Net total appropriated and allotted		602,000.00
Balance unexpended July 1, 1916.....	\$2,000.00	
Appropriated since July 1, 1916.....	600,000.00	
		602,000.00

DAM NO. 26.

Mar. 3, 1905 (allotted Mar. 14, 1905)	\$35,000.00	
Mar. 2, 1907 (repealed by river and harbor act)	35,000.00	
Mar. 2, 1907 (allotted Mar. 9, 1907)	235,000.00	
May 27, 1908 (allotted June 6, 1908)	110,000.00	
Mar. 4, 1909 (allotted Mar. 12, 1909)	300,000.00	
June 25, 1910 (allotted July 6, 1910)	400,000.00	
Mar. 4, 1911 (allotted Mar. 10, 1911)	155,000.00	
June 23, 1913 (allotted July 7, 1914)	30,000.00	
June 25, 1910 (allotted July 14, 1914)	25,000.00	
		\$1,255,000.00

¹ This amount includes \$80.23 reimbursable and unsettled.

2754 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Transferred to Dam No. 14, Dec. 15, 1915	\$20,000.00	
Transferred to Dam No. 23, Mar. 20, 1915	1,100.00	
Transferred to Dam No. 14, Jan. 29, 1916	6,326.26	
		\$27,426.26
Net total appropriated and allotted		1,227,573.74
Receipts from sales and other sources		1,273.98
Grand total of receipts from all sources		1,228,847.72
Expended on work to June 30, 1916		1,228,847.72

DAM NO. 27.

Mar. 4, 1915 (allotted Mar. 15, 1916)	\$2,000.00	
July 27, 1916 (allotted Aug. 1, 1916)	600,000.00	
Net total appropriated and allotted		\$602,000.00
Balance unexpended July 1, 1916	2,000.00	
Appropriated since July 1, 1916	600,000.00	
		602,000.00

DAM NO. 28.

Feb. 27, 1911 (allotted Apr. 7, 1911)	\$100,000.00	
Feb. 27, 1911 (allotted June 14, 1911)	150,000.00	
July 25, 1912 (allotted Aug. 17, 1912)	300,000.00	
Mar. 4, 1913 (allotted June 12, 1913)	300,000.00	
June 23, 1913 (allotted July 7, 1914)	50,000.00	
June 25, 1910 (allotted July 15, 1914)	34,567.19	
Mar. 4, 1913 (allotted Aug. 5, 1914)	50,000.00	
Oct. 2, 1914 (allotted Oct. 14, 1914)	50,000.00	
June 23, 1913 (allotted Mar. 20, 1915)	1,100.00	
		\$1,035,667.19
Transferred to Dam No. 14, Jan. 29, 1916		19,000.00
Net total appropriated and allotted		1,016,667.19
Receipts from sales and other sources		1,249.23
Grand total of receipts from all sources		1,017,916.42
Expended on work to June 30, 1916		1,017,916.42

CONTINGENCIES.

Mar. 4, 1913 (allotted May 5, 1914)	\$2,500.00	
Mar. 4, 1913 (allotted July 14, 1914)	10,000.00	
Mar. 4, 1913 (allotted Feb. 25, 1915)	3,500.00	
Net total appropriated and allotted		16,000.00
Expended on work to June 30, 1916		16,000.00

CONSOLIDATED STATEMENT.

Total appropriated or allotted, as shown by preceding statements for individual dams		¹\$17,984,719.85
Transferred to other district (from Nos. 16 and 17 to No. 39)		80,000.00
Net total of appropriations and allotments		17,904,719.85
Receipts from sales and other sources		9,320.59
Total receipts from all sources		17,914,040.44
Expended on the work to June 30, 1916	\$14,039,683.87	
Balance unexpended July 1, 1916	1,446,856.57	
Appropriated since July 1, 1916	2,427,500.00	
		17,914,040.44

¹ Of this amount \$855,198.85 was received by transfer from other districts as follows:

From Pittsburgh district	\$30,198.85
From first Cincinnati district	75,000.00
From Louisville district	250,000.00

CONTRACTS IN FORCE.

DAM NO. 12.

Contractor: The Foundation Co. (substituted for the Pneumatic Caisson Co., as provided in supplemental contract dated Aug. 15, approved Aug. 17, 1911).

Amount and character of work: \$917,537.21; constructing lock and dam.

Rates: Cofferdam, 16-foot, at \$20 per linear foot; cofferdam, 10-foot, \$10 per linear foot; common excavation, 65 cents per cubic yard; rock excavation, \$5 per cubic yard; fill, 50 cents per cubic yard; riprap, \$3 per cubic yard; stone paving, \$6 per cubic yard; round piles, 50 cents per linear foot; sheet piles, \$60 per 1,000 feet b. m.; common timber, \$50 per 1,000 feet b. m.; deck timber, \$60 per 1,000 feet b. m.; oak timber, \$80 per 1,000 feet b. m.; reinforced concrete, \$15 per cubic yard; concrete, \$6.50 per cubic yard; structural steel, 6.3 cents per pound; reinforcing rods, 4 cents per pound; forgings, 8.5 cents per pound; bolts, etc., 5 cents per pound; iron castings, 4 cents per pound; steel castings, 5.5 cents per pound; bronze, 80 cents per pound; pipe, 5-inch, \$2 per linear foot; pipe, 4-inch, \$1.80 per linear foot; pipe, 3-inch, \$1.50 per linear foot; pipe, 2½-inch, \$1 per linear foot; pipe, 2-inch, 80 cents per linear foot; tile drain, 70 cents per linear foot.

Date of approval: December 3, 1910.

Date of beginning: December 22, 1910.

Date of expiration: December 9, 1914. (Time limit waived.)

Completed.

Contractor: E. Keeler Co.

Amount and character of work: \$2,747, furnishing one main boiler, one auxiliary boiler, and accessories for both.

Rate: One main boiler, one auxiliary boiler, and accessories, for \$2,747.

Date of approval: July 16, 1914.

Date of beginning: As soon as conditions at the site will permit.

Date of expiration: Within 30 days after completion of power house.

Completed.

DAMS NOS. 12 AND 20.

Contractor: Pittsburgh Trolley & Forge Co.

Amount and character of work: \$17,137.05; furnishing horses and props for pass and weir.

Rates: For Dam No. 12, pass horses and props for \$12,033.79; weir horses and props for \$2,565.84. For Dam No. 20, weir horses and props for \$2,537.42.

Date of contract: June 4, 1915.

Date of beginning: June 14, 1915.

Date of expiration: October 2, 1915. (Time limit waived.)

Completed.

Contractor: Independent Bridge Co.

Amount and character of work: \$50,980; furnishing and erecting steel lock gates.

Rates: For Dam No. 12, one pair of steel lock gates for \$24,980. For Dam No. 20, one pair of steel lock gates for \$25,950.

Date of approval: June 22, 1915.

Date of beginning: July 15, 1915.

Date of expiration: Within 45 fair working days after October 13, 1915. (Extended by supplemental contract, approved Feb. 21, 1916, to June 1, 1916, or such time thereafter as river conditions will permit.)

Completed at end of fiscal year: 92 per cent.

Contractor: Penn Bridge Co.

Amount and character of work: \$5,530, furnishing service-bridge trestles and aprons.

Rates: For Dam No. 12, service-bridge trestles and aprons for \$2,790. For Dam No. 20, service-bridge trestles and aprons, for \$2,740.

Date of contract: May 29, 1915.

Date of beginning: June 8, 1915.

Date of expiration: For Dam No. 12, September 28, 1915. For Dam No. 20, August 27, 1915. (Time limit waived.)

Completed.

Contractor: Independent Bridge Co.

Amount and character of work: \$4,992, furnishing recess and engine-pit covers.

Rates: For Dam No. 12, recess and engine-pit covers for \$2,437. For Dam No. 20, recess and engine-pit covers for \$2,555.

Date of contract: May 29, 1915.

Date of beginning: June 8, 1915.

Date of expiration: August 27, 1915.

Completed.

DAMS NOS. 12, 14, AND 20.

Contractor: Beckwith Machinery Co.

Amount and character of work: \$3,939, with \$150 additional if delivery be made by boat, for furnishing six gate engines.

Rates: For Dam No. 12, two engines for \$1,813. For Dam No. 14, two engines for \$1,813. For Dam No. 20, two engines for \$1,813. For delivery by boat, \$50 additional at each dam.

Date of approval: May 20, 1916.

Date of beginning: June 4, 1916.

Date of expiration, August 23, 1916.

Completed at end of fiscal year: 25 per cent.

Contractor: Bury Compressor Co.

Amount and character of work: \$6,540, with \$150 additional if delivery be made by boat, furnishing six air compressors.

Rates: For Dam No. 12, two air compressors for \$2,180. For Dam No. 14, two air compressors for \$2,180. For dam No. 20, two air compressors for \$2,180. For delivery by boat, \$50 additional at each dam.

Date of approval: April 26, 1916.

Date of beginning: May 9, 1916.

Date of expiration: July 28, 1916.

Completed at end of fiscal year: 75 per cent.

Contractor: H. P. Gazzam Machine Co.

Amount and character of work: \$9,750, with \$150 additional if delivery be made by boat, for furnishing six gate winches.

Rates: For Dam No. 12, two gate winches for \$3,250. For Dam No. 14, two gate winches for \$3,250. For Dam No. 20, two gate winches for \$3,250. For delivery by boat, \$50 additional at each dam.

Date of approval: March 30, 1916.

Date of beginning: April 14, 1916.

Date of expiration: July 3, 1916.

Completed at end of fiscal year: 50 per cent.

Contractor: Paul A. Staley and J. F. Trump, jr., receivers of the Trump Manufacturing Co.

Amount and character of work: \$6,000, furnishing six water turbines, complete. If delivery be made by boat, \$150 additional.

Rates: For Dam No. 12, two water turbines for \$2,000. For Dam No. 14, two water turbines for \$2,000. For Dam No. 20, two water turbines for \$2,000. For delivery by boat, \$50 additional at each dam.

Date of approval: March 31, 1916.

Date of beginning: April 14, 1916.

Date of expiration: July 3, 1916.

Completed at end of fiscal year: 80 per cent.

Contractor: J. & J. B. Milholland Co.

Amount and character of work: \$8,580, furnishing river-wall valve jacks.

Rates: For Dam No. 12, 32 river-wall valve jacks for \$2,860; for Dam No. 14, 32 river-wall valve jacks for \$2,860; for Dam No. 20, 32 river-wall valve jacks for \$2,860.

Date of approval: March 28, 1916.

Date of beginning: April 10, 1916.

Date of expiration: June 29, 1916.

Completed at end of fiscal year: 10 per cent.

DAM NO. 14.

Contractor: The Missouri Valley Bridge & Iron Co.

Amount and character of work: \$864,971, constructing lock and dam.

Rates, Cofferdam, 16-foot, at \$25.70 per linear foot; cofferdam, 10-foot, \$11 per linear foot; common excavation, 60 cents per cubic yard; rock excavation, \$2.50 per cubic yard; drilling bolt holes, 70 cents per linear foot; fill, 42 cents per cubic yard; riprap, \$2.50 per cubic yard; reinforced concrete, \$12 per cubic yard; stone paving, \$5 per cubic yard; round piles, 50 cents per linear foot; sheet piles, \$70 per 1,000 feet b. m.; oak timber, \$100 per 1,000 feet b. m.; concrete, \$5.40 per cubic yard; concrete paving, \$7.50 per cubic yard; structural steel, 7.5 cents per pound; reinforcing rods, 4 cents per pound; forgings (including wrought iron), 7 cents per pound; bolts, etc., 6 cents per pound; iron castings, 5.5 cents per pound; steel castings, 8.5 cents per pound; bronze, 75 cents per pound; pipe, 5-inch, \$2.50 per linear foot; pipe, 4-inch, \$2 per linear foot; pipe, 3-inch, \$1.50 per linear foot; pipe, 2½-inch, \$1.20 per linear foot; pipe, 2-inch, \$1 per linear foot; tile drain, 50 cents per linear foot.

Date of approval: June 9, 1911.

Date of beginning: July 15, 1911.

Date of expiration: June 15, 1915. (Time limit waived.)

Supplemental contract approved July 24, 1914, provides for change in plans for esplanade under lock and dam contract. (The prices of the original contract are not changed by the supplemental contract.)

Completed at end of fiscal year: 96.4 per cent.

Contractor: The Ohio Building & Construction Co.

Amount and character of work: \$23,500 building power house and boiler chimney.

Rates: Power house and boiler chimney complete for \$23,500; extra concrete, at \$8 per cubic yard; extra excavation, at \$0.75 per cubic yard.

Date of approval: February 14, 1916.

Date of beginning: Shopwork, March 17; at site, May 16, 1916.

Date of expiration: September 13, 1916.

Completed at end of fiscal year: 20 per cent at site; 90 per cent of shopwork.

Contractor: F. H. Zimmers.

Amount and character of work: \$3,939, with \$150 additional for delivery by boat, furnishing structural steel (recess and machinery-pit covers).

Rate: Structural steel (recess and machinery-pit covers) for \$5,799.19 for rail delivery, with \$150 additional for delivery by boat.

Date of contract: May 31, 1916.

Date of beginning: June 10, 1916.

Date of expiration: October 28, 1916.

Completed at end of fiscal year: 0 per cent.

Contractor: Independent Bridge Co.

Amount and character of work: \$35,490, furnishing and erecting steel lock gates.

Rates: Two lock gates furnished and erected for \$35,490.

Date of approval: February 3, 1916.

Date of beginning: February 27, 1916.

Date of expiration: Forty-five fair working-days after June 15, 1916.

Completed at end of fiscal year: 75 per cent of shopwork.

DAMS NOS. 14, 16, AND 17.

Contractor: J. & J. B. Millholland Co.

Amount and character of work: \$56,687, furnishing pass and weir horses and props.

Rates: For Dam No. 14, 153 pass horses and props for \$14,298.75, 37 weir horses and props for \$2,650; for Dam No. 16, 153 pass horses and props for \$13,924.75, 43 weir horses and props for \$3,100; for Dam No. 17, 178 pass horses and props for \$16,205.25, 91 weir horses and props for \$6,508.25.

Date of approval: February 29, 1916.

Date of beginning: March 23, 1910.

Date of expiration: July 31, 1916.

Completed at end of fiscal year: 20 per cent of shopwork.

Contractor: American Bridge Co.

Amount and character of work: \$33,750, building three maneuver boats, one each for Dams Nos. 14, 16, and 17.

Rates: \$11,250 for each boat.

Date of approval: April 7, 1916.

Date of beginning: April 21, 1916.

Date of expiration: First boat, October 28, 1916; second boat, November 7, 1916; third boat, November 17, 1916.

Completed at end of fiscal year: 5 per cent.

DAM NO. 15.

Contractor: Pen Bridge Co.

Amount and character of work: \$28,741, furnishing and erecting lock gates.

Rates: Structural steel, at \$0.0465 per pound; forgings (including springs), \$0.045 per pound; bolts, etc., \$0.045 per pound; iron castings, \$0.04 per pound; steel castings, \$0.06 per pound; bronze, \$0.50 per pound; rubber \$1 per pound; and oak timber at \$50 per 1,000 feet b. m.

Date of approval: February 23, 1915.

Date of beginning: March 29, 1915.

Date of expiration: Within 45 fair working days after June 30, 1915.

Completed.

DAM NO. 16.

Contractor: The T. A. Gillespie Co.

Amount and character of work: \$970,499.34, constructing lock and dam.

Rates: Cofferdam, 16-foot, at \$25 per linear foot; cofferdam, 10-foot, at \$12.50 per linear foot; common excavation, at \$0.80 per cubic yard; rock excavation, at \$4 per cubic yard; rock channeling, at \$0.50 per square foot; drilling bolt holes, at \$1 per linear foot; fill, at \$0.60 per cubic yard; riprap, at \$3.50 per cubic yard; round piles, at \$0.50 per linear foot; sheet piles, at \$100 per 1,000 feet b. m.; oak timber, at \$135 per 1,000 feet b. m.; reinforced concrete, at \$12 per cubic yard; concrete, at \$6.05 per cubic yard; concrete paving, at \$7.50 per cubic yard; structural steel, at \$0.07 per pound; reinforcing rods, at \$0.05 per pound; forgings (including wrought iron) at \$0.07 per pound; bolts, etc., at \$0.07 per pound; iron castings, at \$0.05 per pound; steel castings, at \$6.10 per pound; bronze, at \$1 per pound; pipe, 5-inch, at \$2 per linear foot; pipe, 4-inch, at \$1.50 per linear foot; pipe, 3-inch, at \$1.50 per linear foot; pipe, 2½-inch, at \$1 per linear foot; pipe, 2-inch, at \$0.75 per linear foot; pipe, 1½-inch, at \$0.50 per linear foot; pipe, 1¼-inch, at \$0.30 per linear foot; pipe, 1-inch, at \$0.30 per linear foot; tile drain, at \$0.50 per linear foot.

Date of approval: August 18, 1913.

Date of beginning: September 15, 1913.

Date of expiration: August 16, 1917.

Supplemental contract approved September 4, 1914, provides for metering lock gates instead of rolling type, and necessary changes in power plant, operating machinery, and piping; provides for lighting towers on river wall; use of sheet piles in bearing under guide walls; and an improved water tank for filtered water supply. Amount of contract, \$40,000.

Completed.

Contractor: The Hood Lumber Co.

Amount and character of work: \$4,526.88, furnishing timber for wickets.

Rate: \$30 per 1,000 feet b. m.

Date of approval: November 15, 1915.

Date of beginning: November 27, 1915.

Date of expiration: January 31, 1916. (Time limit waived.)

Completed.

DAM NO. 17.

Contractor: The T. A. Gillespie Co.

Amount and character of work: \$1,059,180.83, constructing lock and dam.

Rates: Cofferdam, 16-foot, at \$25 per linear foot; cofferdam, 10-foot, at \$12.50 per linear foot; common excavation, at \$0.70 per cubic yard; rock excavation, at \$4 per cubic yard; rock channeling, at \$0.50 per square foot; drilling bolt holes, at \$1 per linear foot; fill, at \$0.60 per cubic yard; riprap, at \$3.50 per cubic yard; round piles, at \$0.50 per linear foot; sheet piles, at \$100 per 1,000

feet b. m.; oak timber, at \$135 per 1,000 feet b. m.; reinforced concrete, at \$12 per cubic yard; concrete, at \$6 per cubic yard; concrete paving, at \$7.50 per cubic yard; structural steel, at \$0.07 per pound; reinforcing rods, at \$0.05 per pound; forgings (including wrought iron), at \$0.07 per pound; bolts, etc., at \$0.07 per pound; iron castings, at \$0.05 per pound; steel castings, at \$0.10 per pound; bronze, at \$1 per pound; pipe, 5-inch, at \$2 per linear foot; pipe, 4-inch at \$1.50 per linear foot; pipe, 3-inch, at \$1.50 per linear foot; pipe 2½-inch, at \$1 per linear foot; pipe, 2-inch, at \$0.75 per linear foot; pipe, 1½-inch, at \$0.50 per linear foot; pipe, 1-inch at \$0.30 per linear foot; pipe, 1-inch, at \$0.30 per linear foot; tile drain, at \$0.50 per linear foot.

Date of approval: August 15, 1913.

Date of beginning: September 18, 1913.

Date of expiration: August 19, 1917.

Supplemental contract approved September 4, 1914, provides for mitring lock gates instead of rolling type, and necessary changes in power plant, operating machinery, and piping; provides for lighting towers on river wall, use of sheet piles in bearing under guide walls, and an improved water tank for filtered water supply. Amount of contract: \$20,000.

Completed.

Contractor: Rockcastle Lumber Co.

Amount and character of work: \$6,013.66, furnishing timber for wickets.

Rates: White-oak timber at \$30 per 1,000 feet b. m.

Date of approval: November 15, 1915.

Date of beginning: November 28, 1915.

Date of expiration: February 16, 1916. (Time limit waived.)

Completed.

DAMS NOS. 16 AND 17.

Contractor: The Ohio Building & Construction Co.

Amount and character of work: \$88,850, building power houses.

Rates: For Dam No. 16, power house, \$18,950; extra concrete, \$9 per cubic yard; extra excavation, \$1 per cubic yard. For Dam No. 17, power house, \$19,900; extra excavation, \$1 per cubic yard; extra concrete, \$9 per cubic yard.

Date of approval: March 30, 1916.

Date of beginning: Shopwork, May 4, 1916; at site, July 3, 1916.

Date of expiration: October 31, 1916.

Completed at end of fiscal year: 10 per cent.

Contractor: Lawrence D. Weaning.

Amount and character of work: \$8,590, furnishing structural steel, etc., for wickets.

Rates: For Dam No. 16, structural steel for \$3,000; bolts and rods for \$760. For Dam No. 17, structural steel for \$3,900; bolts and rods for \$930.

Date of approval: November 6, 1915.

Date of beginning: November 20, 1915.

Date of expiration: For Dam No. 16, January 24, 1916; for Dam No. 17, February 8, 1916. (Time limit waived.)

Completed.

Contractor: Penn Bridge Co.

Amount and character of work: \$2,004, furnishing forgings for wickets.

Rates: Dam No. 16, forgings for \$867. Dam No. 17, forgings for \$1,137.

Date of approval: November 17, 1915.

Date of beginning: December 7, 1915.

Date of expiration: February 25, 1916.

Completed.

Contractor: The Whitehead & Kales Iron Works.

Amount and character of work: \$81,116.84, furnishing and erecting two sets of mitring lock gates.

Rates: For Dam No. 16, one set of lock gates, \$40,558.42. For Dam No. 17, one set of lock gates for \$40,558.42.

Date of approval: March 3, 1916.

Date of beginning: April 2, 1916.

Date of expiration: Eighty fair working days after June 15, 1916.

Completed at end of fiscal year: 2 per cent.

Contractor: J. & J. B. Millholland Co.
 Amount and character of work: \$2,230, furnishing steel castings for wickets.
 Rates: For Dam No. 16, steel castings, for \$940. For Dam No. 17, steel castings, for \$1,290.

Date of approval: November 6, 1915.

Date of beginning: November 20, 1915.

Date of expiration: For Dam No. 16, January 24, 1916. (Time limit waived.)
 Completed.

Contractor: Centre Foundry & Machine Co.
 Amount and character of work: \$6,600, with \$50 additional for delivery by boat, furnishing river-wall valve jacks.

Rates: For Dam No. 16, 84 river-wall valve jacks for \$3,800. For Dam No. 17, \$3,800. For delivery by boat, \$25 additional at each dam.

Date of contract: April 27, 1916.

Date of beginning: May 7, 1916.

Date of expiration: July 26, 1916.

Completed at end of fiscal year: 10 per cent.

DAMS NO. 15 AND 19.

Contractor: S. Morgan Smith Co.
 Amount and character of work: \$4,477, furnishing four water turbines with gearing.

Rates: For Dam No. 15, two water turbines, with gearing, for \$2,229. For Dam No. 19, two water turbines, with gearing, for \$2,248.

Date of approval: July 18, 1915.

Date of beginning: July 26, 1915.

Date of expiration: For Dam No. 15, September 14, 1915; for Dam No. 19, October 14, 1915.

Completed.

Contractor: Rosedale Foundry & Machine Co.
 Amount and character of work: \$4,580, furnishing four gate winches.
 Rate: For Dam No. 15, two gate winches, for \$2,290. For Dam No. 19, two gate winches for \$2,290.

Date of approval: July 7, 1915.

Date of beginning: July 22, 1915.

Date of expiration: For Dam No. 15, October 10, 1915; for Dam No. 19, November 9, 1915. (Time limit waived.)

Completed.

Contractor: Bury Compressor Co.
 Amount and character of work: \$3,480, furnishing four air compressors with accessories.

Rates: For Dam No. 15, two air compressors with accessories for \$1,740. For Dam No. 19, two air compressors with accessories for \$1,740.

Date of approval: July 13, 1915.

Date of beginning: July 28, 1915.

Date of expiration: For Dam No. 15, September 14, 1915. For Dam No. 19, October 14, 1915. (Time limit waived.)

Completed.

Contractor: Centre Foundry & Machine Co.
 Amount and character of work: \$4,500, furnishing river-wall valve jacks.
 Rates: For Dam No. 15, 82 river-wall valve jacks for \$2,250. For Dam No. 19, 82 river-wall valve jacks for \$2,250.

Date of approval: July 7, 1915.

Date of beginning: July 22, 1915.

Date of expiration: For Dam No. 15, October 10, 1915. For Dam No. 19, November 9, 1915. (Time limit waived.)

Completed.

DAM NO. 20.

Contractor: Sheridan-Kirk Contract Co.
 Amount and character of work: \$720,058.98, including supplemental contracts (original amount of contract, \$658,825.10), constructing lock and dam.

Rates: Cofferdam, 16-foot, at \$20 per linear foot; cofferdam, 10-foot, \$5 per linear foot; common excavation, 60 cents per cubic yard; rock excavation, \$1 per cubic yard; fill, 40 cents per cubic yard; riprap, \$3 per cubic yard; stone paving, \$6 per cubic yard; round piles, 70 cents per linear foot; sheet piles, \$70 per 1,000 feet b. m.; oak timber, \$80 per 1,000 feet b. m.; reinforced concrete, \$12 per cubic yard; concrete, \$5.61 per cubic yard; concrete paving, \$7.73 per cubic yard; structural steel, 6.5 cents per pound; reinforcing rods, 5.5 cents per pound; forgings (including wrought iron), 5.8 cents per pound; bolts, etc., 5.5 cents per pound; iron castings, 5.5 cents per pound; steel castings, 9.8 cents per pound; bronze, 85 cents per pound; pipe, 5-inch, \$1.59 per linear foot; pipe, 4-inch, \$1.10 per linear foot; pipe, 8-inch, 77 cents per linear foot; pipe, 2½-inch, 60 cents per linear foot; pipe, 2-inch, 40 cents per linear foot; tile drain, 55 cents per linear foot.

Date of approval: June 2, 1911.

Date of beginning: July 6, 1911.

Date of expiration: September 6, 1915. (Time limit waived.)

First supplemental contract approved September 13, 1913, provided for rock channeling and drilling for and setting bolts at the following rates: Channeling, \$1 per square foot, and drilling for and setting bolts at 60 cents per linear foot.

Second supplemental contract approved September 7, 1915, provided for modification in esplanade to conform to present bank conditions; quantity of concrete increased at the same rate as provided by original contract.

Completed.

DAMS NOS. 21 AND 22.

Contractor: J. & J. B. Milholland Co.

Amount and character of work: \$18,648.27, furnishing structural steel, steel castings, etc.

Rates: Lot A, Dam No. 21, structural steel, at \$0.0225 per pound; Dam No. 22, structural steel, \$0.0223 per pound; lot D, Dam No. 21, steel castings, \$0.0493 per pound; Dam No. 22, steel castings, \$0.0493 per pound; lot E, Dam No. 21, bolts, \$0.0238 per pound; Dam No. 22, bolts, \$0.0238 per pound.

Date of contract: May 14, 1915.

Date of beginning: May 24, 1915.

Date of expiration: Varies from June 30 to November 30, 1915.

Completed.

Contractor: Penn Bridge Co.

Amount and character of work: \$8,825.73; Dam No. 21, \$5,425.33; Dam No. 22, \$3,400.40; furnishing forgings, iron castings, etc.

Rates: Dam No. 21, lot B, forgings, \$0.03 per pound; lot C, iron castings, \$0.0188 per pound; lot F, bronze, \$0.75 per pound; Dam No. 22, lot B, forgings, \$0.029 per pound; lot C, iron castings, \$0.017 per pound.

Date of contract: May 17, 1915.

Date of beginning: May 27, 1915.

Date of expiration: Varies from June 30 to November 30, 1915. (Time limit waived.)

Completed.

Contractor: Universal Portland Cement Co.

Amount and character of work: \$73,600, furnishing cement.

Rate: \$1.60 per barrel of 876 pounds net (10 cents to be allowed for each empty sack returned).

Date of approval: June 15, 1915.

Date of beginning: June 15, 1915, or as needed.

Date of expiration: November 15, 1915, or following season.

Completed at end of fiscal year: 40 per cent.

DAM NO. 22.

Contractor: J. & J. B. Milholland Co.

Amount and character of work: \$2,910.19, furnishing river-wall valve blades, etc.

Rates: Structural steel, \$0.0300 per pound; cast steel, \$0.0515 per pound; cast iron, \$0.025 per pound; bolts, etc., \$0.0275 per pound; bronze, \$0.75 per pound.

Date of contract: May 7, 1915.

Date of beginning: May 17, 1915.

Date of expiration: August 5, 1915. (Time limit waived.)

Completed at end of fiscal year: 97 per cent.

DAM NO. 24.

Contractor: Sheridan-Kirk Contract Co.

Amount and character of work: \$821,513.10, constructing lock and dam.

Rates: Cofferdam, 16-foot, at \$25 per linear foot; cofferdam, 10-foot, at \$15 per linear foot; common excavation, at \$0.70 per cubic yard; rock excavation, at \$3.58 per cubic yard; rock channeling, at \$0.60 per square foot; drilling bolt holes, at \$0.35 per linear foot; fill, at \$0.60 per cubic yard; riprap, at \$3.50 per cubic yard; oak timber, at \$100 per 1,000 feet b m.; reinforced concrete, at \$15 per cubic yard; concrete, at \$6.50 per cubic yard; concrete paving, at \$7 per cubic yard; structural steel, at \$0.07 per pound; reinforcing rods, at \$0.065 per pound; forgings (including wrought iron), at \$0.075 per pound; bolts, etc., at \$0.065 per pound; iron castings, at \$0.065 per pound; steel castings, at \$0.11 per pound; bronze, at \$1.15 per pound; pipe, 6-inch, at \$3.35 per linear foot; pipe, 4-inch, at \$2.75 per linear foot; pipe, 3-inch, at \$2 per linear foot; pipe, 2½-inch, at \$1.50 per linear foot; pipe, 2-inch, at \$1.25 per linear foot; pipe, 1½-inch, at \$1.15 per linear foot; pipe, 1¼-inch, at \$1 per linear foot; pipe, 1-inch, at \$1 per linear foot; tile drain, at \$1.25 per linear foot.

Date of approval: August 28, 1913.

Date of beginning: October 5, 1913.

Date of expiration: September 5, 1917.

Completed at end of fiscal year: 53 per cent.

DAM NO. 28.

Contractor: S. Morgan Smith Co.

Amount and character of work: \$2,470, furnishing two water turbines.

Rate: Two 60-horse-power water turbines for \$2,470.

Date of contract: November 27, 1914.

Date of beginning: December 17, 1914.

Date of expiration: January 26, 1915. (Time limit waived.) Completed.

DAMS NOS. 12, 14, 15, 16, 17, 19, 20, AND 24.

Contractor: Charles Hegewald Co.

Amount and character of work: \$3,719.92, furnishing valve-operating mechanisms for various dams.

Rates: Valve-operating mechanism, complete, delivered to the following-named dams, viz: Dam No. 12, \$464.99; Dam No. 14, \$464.99; Dam No. 15, \$464.99; Dam No. 16, \$464.99; Dam No. 17, \$464.99; Dam No. 19, \$464.99; Dam No. 20, \$464.99; Dam No. 24, \$464.99.

Date of contract: August 10, 1915.

Date of beginning: August 20, 1915.

Date of expiration: October 9, 1915. (Time limit waived.) Completed.

LOCKS AND DAMS NOS. 29, 31, 33, 35, AND 39, OHIO RIVER.

REPORT OF MAJ. GEO. R. SPALDING, CORPS OF ENGINEERS.

FIRST DISTRICT, CINCINNATI, OHIO.

LOCK AND DAM NO. 29.

The work of constructing this lock and dam was carried on under contract with Bates & Rogers Construction Co., of Chicago, Ill., dated April 8, 1911.

River conditions.—The river during the first half of the year was at a favorable stage for the prosecution of the work, but during the period from December 31 to June 30 the river remained at a high stage and work below top of banks was greatly hindered.

Cofferdams.—The navigable pass, piers, bear traps, Chanoine weir and abutment being completed the cofferdams surrounding them were removed.

Common excavation.—Excavation for abutment, also that on the Ohio bank back of abutment was completed.

Rock excavation.—Rock excavation during this year consisted only of that not previously taken out of tail race of Pier No. 1. This was completed, and winds up rock excavation for Dam 29.

Fill.—Filling around gate recesses and back of abutment was completed.

Riprap.—Riprap was placed on slopes around both recesses and back of abutment.

Timber.—Oak timber was placed in navigable pass and in bear-trap leaves.

Concrete.—Concrete was placed in an additional core wall above the Ohio abutment.

Concrete paving.—Concrete paving was placed on Kentucky slope walls and esplanade.

Ironwork.—The various items of ironwork materials prepared and delivered at the site on which partial payment was made and those placed in final position are given in the summary.

Drilling bolt holes.—No bolt holes were drilled as this work had all been completed.

Incidental labor.—Incidental labor under paragraph 21 of the specifications was performed as stated in summary.

The following table shows the work done and materials placed during the fiscal year under the first contract:

Item.	Designation.	Quantity.	Unit price.
Cofferdam, 16-foot:			
Constructed.....	Linear feet.....	1, 109	\$9. 24
Removed.....	do.....	1, 845	8. 96
Common excavation.....	Cubic yards.....	22, 533	. 65
Rock excavation.....	do.....	11	3. 80
Fill.....	do.....	13, 053	. 45
Riprap.....	do.....	2, 186	3. 80
Oak timber.....	Feet b. m.....	53, 725	100. 00
Concrete.....	Cubic yards.....	257	6. 85
Concrete paving.....	do.....	90	7. 20
Drilling bolt holes.....			. 75
Structural steel:			
Delivered.....			.0284
Placed in work.....	Pounds.....	68, 890	.0256
Forgings:			
Delivered.....			.006
Placed in work.....	Pounds.....	5, 310	.044
Reinforcing rods:			
Delivered.....			.021
Placed in work.....			.014
Bolts:			
Delivered.....			.0414
Placed in work.....	Pounds.....	3, 246	.0276
Iron castings:			
Delivered.....			.039
Placed in work.....	Pounds.....	5, 040	.026
Steel castings:			
Delivered.....			.084
Placed in work.....	Pounds.....	2, 942	.066
Bronze.....	do.....	13.	.30
Pipe:			
6-inch.....	Linear feet.....	20	1. 85
4-inch.....	do.....	71	1. 35
3-inch.....	do.....	699	1. 35
Unskilled labor.....	Hours.....	171	. 25
Skilled labor.....	do.....	154	. 50
Extra material (total cost).....			55. 00

The above completes work on first contract by Bates & Rogers Construction Co., who finished November 30, 1915.

Other contracts.—Other contracts entered into were as follows:

For constructing power house, with G. W. Ward & Son. Work was commenced August 10, 1915, and power house was completed June 5, 1916. Contract price, \$18,612.

For installing operating machinery in power house, with Miller Supply Co. Work commenced November 25, 1915, and finished June 26, 1916. Total cost, \$9,465.77.

For furnishing I beams for gate recesses, with Cincinnati Iron & Steel Co. I beams were completed and received at site January 30, 1916. Cost, \$903.02.

For furnishing cover plates for gate recesses, with Penn Bridge Co. Cover plates completed and received at site. Cost, \$3,450.51.

For construction and erection of lock gates, with C. A. Turner (Inc.). Erection of upper lock gate began June 12, 1916. Work on gate interrupted by freshet June 17 and not resumed until June 30. Lower lock gate is now at the site but is not yet assembled. Work of erection is estimated as 10 per cent completed.

For filling terrace, by Western Rivers Co. Work began October 1, 1915, and continued except as interrupted by weather conditions and by construction of power house. Fill is estimated 90 per cent completed.

For furnishing and installing valve and gate operating machinery, with J. & J. B. Millholland Co. Shop work is estimated as 95 per cent completed. Installation is not yet begun.

WORK DONE BY UNITED STATES DAY LABOR.

Cleaning lock-gate recesses.—Both recesses were cleaned out in December and upper recess again cleaned out in June. Cleaning lower recess in progress at close of year.

Grading and riprapping Ohio bank below abutment.—Work was in progress during the working season until December. No further protection is considered necessary.

Placing wickets in Chanoine weir and navigable pass.—Chanoine weir wickets were all installed and 123 navigable pass wickets installed previous to December 17, 1915, leaving 52 wickets yet to be placed. To the close of the year the river has been at an unfavorable stage for completing this work.

Additional work.—Concrete foundations were completed for the two lock houses by contract.

On June 30, 1916, it is estimated that the whole work is 91 per cent completed.

APPROPRIATIONS.

DAM NO. 29.

June 25, 1910 (allotted July 7, 1910)	-----	\$150,000.00
Feb. 27, 1911 (allotted Apr. 7, 1911)	-----	52,000.00
Mar. 4, 1911 (allotted Apr. 7, 1911)	-----	480,000.00
July 25, 1912 (allotted Nov. 4, 1913)	-----	50,000.00
Aug. 1, 1914 (allotted Aug. 5, 1914)	-----	99,000.00
Oct. 2, 1914 (allotted Oct. 14, 1914)	-----	12,000.00
Mar. 3, 1915 (allotted Mar. 15, 1915)	-----	76,000.00
Mar. 4, 1915 (allotted Apr. 13, 1915)	-----	200,000.00
July 27, 1916 (allotted Aug. 1, 1916)	-----	23,900.00
	-----	\$1,122,900.00

CONSTRUCTION OF LOCKS AND DAMS ON THE OHIO RIVER. 2765

Transferred to Dam No. 15.....	\$75,000.00	
Transferred to Dam No. 35.....	39,199.22	
Transferred to Dam No. 39.....	30,072.33	
		\$144,271.55
Net total appropriated and allotted.....		978,628.45
Receipts from sales and other sources.....		80.05
		978,708.50
Grand total of receipts from all sources.....		978,708.50
Expended on work to June 30, 1916.....	\$893,853.96	
Balance unexpended July 1, 1916.....	61,454.54	
Appropriated since July 1, 1916.....	23,900.00	
		978,708.50

CONTRACTS IN FORCE.

Name of contractor: Bates & Rogers Construction Co.

Amount and character of work: \$681,440.86. Constructing Lock and Dam No. 29, Ohio River.

Price per unit: Cofferdam, 16-foot, \$26.40 per linear foot; cofferdam, 10-foot, \$18.05 per linear foot; common excavation, \$0.65 per cubic yard; rock excavation, \$3.60 per cubic yard; fill, \$0.45 per cubic yard; riprap, \$3.60 per cubic yard; oak timber, \$85 per 1,000 feet b. m.; reinforced concrete, \$13 per cubic yard; concrete, \$6.85 per cubic yard; concrete paving, \$7.20 per cubic yard; structural steel, \$0.064 per pound; reinforcing rods, \$0.035 per pound; forgings (including wrought iron), \$0.11 per pound; bolts, etc., \$0.069 per pound; iron castings, \$0.065 per pound; steel castings, \$0.14 per pound; bronze, \$0.75 per pound; pipe, 5-inch, \$1.85 per linear foot; pipe, 4-inch, \$1.35 per linear foot; pipe, 3-inch, \$1.35 per linear foot; pipe, 2½-inch, \$0.75 per linear foot; pipe, 2-inch, \$0.65 per linear foot; tile drain, \$0.65 per linear foot; drilling bolt holes, \$0.75 per linear foot.

Date of approval: April 14, 1911.

Date of beginning: May 18, 1911.

Date of expiration: April 18, 1915. (Time limit waived.)

Per cent of completion: 100.

Name of contractor: C. A. Turner (Inc.).

Amount and character of work: \$28,313.75. Furnishing and erecting lock gates at Dam No. 29, Ohio River.

Price per unit: Structural steel, \$0.42 per pound; forgings, \$0.04 per pound; bolts, etc., \$0.052 per pound; iron castings, \$0.034 per pound; steel castings, \$0.0545 per pound; bronze, \$0.55 per pound; rubber, \$0.90 per pound; oak timber, \$71.50 per 1,000 feet b. m.

Date of approval: June 23, 1915.

Date of beginning: July 28, 1915.

Date of expiration: 45 fair working days from September 15, 1915.

Per cent of completion: 10.

Name of contractor: Geo. W. Ward & Son.

Amount and character of work: \$18,777; constructing power house.

Price per unit: \$18,777.

Date of approval: August 7, 1915.

Date of beginning: August 31, 1915.

Date of expiration: February 7, 1916.

Completed.

Name of contractor: Western Rivers Co.

Amount and character of work: \$6,112; filling terrace.

Price per unit: Common fill, at \$0.64 per cubic yard; loam, at \$0.64 per cubic yard.

Emergency contract dated September 4, 1915.

Date of beginning: October 12, 1915.

Date of expiration: December 1, 1915.

Per cent of completion: 90.

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Name of contractor: J. & J. B. Milholland Co.

Amount and character of work: \$16,467.26; operating machinery.

Price per unit: Duplex reversing engines, at \$803.40 each; cast iron, at \$0.062 per pound; steel castings, at \$0.067 per pound; forged steel, at \$0.0825 per pound; cold-rolled steel, at \$0.062 per pound; tool steel, at \$0.31 per pound; machinery steel, at \$0.11 per pound; wrought-iron or soft-steel bolts and nuts, at \$0.062 per pound; Babbitt metal, at \$0.29 per pound. Standard lap-welded wrought-iron pipe, per linear foot: 3-inch, at \$0.515; 2½-inch, at \$0.3925; 2-inch, at \$0.2575; 1-inch, at \$0.155; ¾-inch, at \$0.105; ½-inch, at \$0.105. Cast-iron elbows, extra heavy, long radius, flanged, 2½-inch, at \$4.74 each. Malleable-iron elbows, long sweep, each: 3-inch, at \$2.32; 2½-inch, extra heavy, at \$1.65; 2½-inch, standard radius, at \$0.62; 2-inch, standard radius, extra heavy, at \$0.62; 1-inch, 45°, extra heavy, at \$0.26. Malleable-iron tees, each: 3-inch, extra heavy, flanged, at \$4.95; 2½-inch, extra heavy, flanged, at \$4.12; 2½ by 2½ by 3 inches, at \$0.73; 1 by 1 by ½ inch, extra heavy, at \$0.42; cast-iron unions, extra heavy, flanged, 3-inch, at \$1.24 each; malleable-iron unions, flanged, 3-inch, at \$1.65 each; brass unions, semifinished, 2½-inch, at \$2.58 each; brass unions, semifinished, 2-inch, at \$1.55 each; brass unions, semifinished, 1-inch, at \$0.83 each; brass unions, semifinished, ¾-inch, at \$0.26 each; 2½ by 2 inch malleable-iron bushings, at \$0.105 each; ½ by ½ inch malleable-iron bushings, at \$0.06 each; 1-inch cast-iron plugs, at \$0.05 each; 3-inch brass globe valves, screw ends, "Lunkenheimer," at \$12.86 each; 2-inch brass whistle, with valve, "Lunkenheimer," at \$3.09 each; brass pressure gauges to 200 pounds, 8½-inch dial, "Lunkenheimer," at \$11.85 each; ½-inch brass air cocks, "Lunkenheimer," at \$0.62 each; 2½-inch throttle valves, "Lidgerwood," at \$15.45 each; wire rope, 1-inch diameter, at \$0.31 per linear foot; cast-iron flanges, extra heavy, raised face, 3-inch pipe, at \$3.09 each; cast-iron flanges, extra heavy, raised face, 3 inch, 1-inch pipe, at \$4.12 each; cast-iron flanges, extra heavy, companion, in pairs, 2½-inch pipe, at \$2.06 each; cutting concrete, at \$2 per cubic foot; drilling bolt holes, at \$1.50 per linear foot; concrete, at \$10 per cubic yard; water turbines, complete, with bevel-gear drives, shafting, and auxiliaries, at \$1,439.25 each; air compressors, horizontal, two-stage, with auxiliaries, at \$1,776.75 each; air-driven oil pump, with auxiliaries, at \$329.60 each; air receiver, with auxiliaries, at \$128.75 each; oil tank, with auxiliaries, at \$61.80 each; standard lap-welded wrought-iron pipe, per linear foot—5-inch, at \$0.93; 4-inch, at \$0.825; 3-inch, at \$0.515; 2½-inch, at \$0.40; 2-inch, at \$0.26; 1½-inch, at \$0.185; 1¼-inch, at \$0.155; 1-inch, at \$0.155; 3-inch, 1-foot 7-inch radius quarter bend, lap-welded wrought-iron pipe, at \$3.09 each; 3 by 3 by 5 inch cast-iron Y, extra heavy, flanged, at \$10.30 each; 3-inch 45° cast-iron elbows, extra heavy, flanged, at \$3.09 each; 3 by 3 by 1½ inch cast-iron T, extra heavy, flanged, at \$4.12 each; malleable-iron elbows, each—1½-inch, long radius, at \$0.62; 2½-inch, long radius, at \$1.29; 2½-inch 45°, at \$1.24; 1½-inch, long radius, at \$0.515; 1-inch, long radius, at \$0.415; 2½ by 2½ by 2½ inch malleable-iron tees, at \$0.67 each; 1½ by 1½ by 1½ inch malleable-iron tees, at \$0.21 each; 2½ by 2½ by 2½ by 2½ inch malleable-iron crosses, at \$1.24 each; 5-inch extra heavy cast-iron flanges, at \$2.22 each; 3-inch extra heavy cast-iron flanges, at \$1.55 each; 3-inch flanged gate valves, at \$6.13 each; 4-inch flanged gate valves, at \$7.73 each; 2½-inch globe valves, screw ends, at \$4.89 each; 3-inch flanged angle gate valves, at \$25.75 each; 1½-inch angle valves, screw ends, at \$3.35 each; 1½-inch angle valves, screw ends, at \$2.06 each; 2½-inch angle safety valves, screw ends, at \$21.11 each; 1½-inch wedge disk valves, screw ends, at \$3.61 each; 1-inch globe valves, at \$1.65 each; ½-inch drip cocks, at \$0.62 each; 1½-inch hose connection, with cap, at \$0.83; strainers, for pipes w24 and w25, at \$3.60 each; pipe hangers, with expansion bolts, for 3-inch pipe, at \$1.03 each; floor supports for 2½-inch pipe, at \$1.55 each; 2½-inch brass unions, semifinished, extra heavy, at \$5.15 each; 2-inch brass unions, semifinished, extra heavy, at \$4.12 each; 1½-inch brass unions, semifinished, extra heavy, at \$3.20 each; 1½-inch brass unions, semifinished, extra heavy, at \$2.67 each; 1-inch brass union, semifinished, extra heavy, at \$2.47 each; jack cylinders, cast iron, at \$0.057 per pound; hand-operating levers, forged iron, at \$0.114 per pound; base plates, cast iron, at \$0.057 per pound; gear sectors, cast steel, at \$0.0825 per pound; racks, cast steel, at \$0.124 per pound; cylinder heads, cast iron, at \$0.0775 per pound; rear-cylinder heads, cast iron, at \$0.0775 per pound; stuffing-box glands, phosphor bronze, at \$0.45 per pound; piston bodies, cast iron, at \$0.1225 per pound; piston packing, leather, at \$0.59 per pound; piston following rings, cast iron, at \$0.2775 per pound; rack rollers, cast iron, at \$0.165 per pound; rack keys, machine steel, at \$0.175 per pound; pinions, cast steel, at \$0.124 per

pound; keys for gear segment, tool steel, at \$0.81 per pound; piston rods, cold-rolled steel, at \$0.072 per pound; pinion spindles, cold-rolled steel, at \$0.072 per pound; rack-roller pins, machine steel, at \$0.072 per pound; bolts, 1 by 12 inch, with washers, steel, at \$0.042 per pound; bolts, $\frac{1}{2}$ by 3 inch, steel, at \$0.042 per pound; bolts, $\frac{1}{2}$ by 5 $\frac{1}{2}$ inch, stud and nut, Tobin bronze, at \$0.07 per pound; bolts, $\frac{1}{2}$ by 1 $\frac{1}{2}$ inch, cap screw, steel, at \$0.062 per pound; bolts, $\frac{1}{2}$ by 2 inch, set screw, steel, at \$0.062 per pound; bolts, $\frac{1}{2}$ by 1 $\frac{1}{2}$ inch, set screw, steel, at \$0.062 per pound; pipe plugs, $\frac{1}{2}$ -inch pipe, cast iron, at \$0.05 per pound; 2 $\frac{1}{2}$ -inch standard lap-welded wrought-iron pipe, at \$0.36 per linear foot; 1-inch standard lap-welded wrought-iron pipe, at \$0.155 per linear foot; 2 $\frac{1}{2}$ -inch malleable-iron elbows, long radius, at \$1.08 each; 1-inch malleable-iron elbows, long radius, at \$0.41 each; 2 $\frac{1}{2}$ by 2 $\frac{1}{2}$ by 1 inch malleable-iron tees, at \$0.52 each; 2 $\frac{1}{2}$ -inch cast-iron plugs, at \$0.11 each; 1-inch globe valves, extra heavy, at \$2.06 each; 2 $\frac{1}{2}$ -inch cast-iron flanges, extra heavy, at \$0.83 each; 1-inch brass unions, extra heavy, at \$1.55 each; gaskets for 2 $\frac{1}{2}$ -inch pipe, soft copper, corrugated, at \$0.21 each; 2 $\frac{1}{2}$ -inch extra heavy, semifinished brass unions, at \$5.15 each.

Date of approval: November 1, 1915.

Date of beginning: November 16, 1915.

Date of expiration: 120 fair working days after November 6, 1915.

Per cent of completion: Shop work only 95 per cent.

Name of contractor: The Miller Supply Co.

Amount and character of work: \$9,814.37; furnishing and installing operating machinery.

Price per unit: Two-stage air compressor, at \$3,200; air receivers, with accessories, at \$585; boiler, with fittings and tools, at \$3,172; feed-water heater, closed type, steel multicoil, at \$118; feed-water pump and drainage receiver, at \$848; oil separator, at \$27; standard lap-welded wrought-iron pipe, per linear foot, 6-inch, at \$0.9558; 5-inch, at \$0.7254; 4-inch, at \$0.5283; 3 $\frac{1}{2}$ -inch, at \$0.5083; 3-inch, at \$0.435; 2 $\frac{1}{2}$ -inch, at \$0.24; 2-inch, at \$0.162; 1 $\frac{1}{2}$ -inch, at \$0.106; 1 $\frac{1}{4}$ -inch, at \$0.084; 1-inch, at \$0.067; $\frac{3}{4}$ -inch, at \$0.045; $\frac{1}{2}$ -inch, at \$0.029; cast-iron elbows, each, 6-inch, long radius, standard, flanged, at \$5.88; 6-inch, base flanged, at \$6.10; 6-inch, 45°, standard, flanged, at \$3.55; 5-inch, long radius, extra heavy, flanged, at \$4.23; 5-inch, 45°, extra heavy, flanged, at \$2.90; 4-inch, long radius, extra heavy, flanged, at \$3.32; 3 $\frac{1}{2}$ -inch, long radius, standard, flanged, at \$2.95; 3-inch, long radius, extra heavy, flanged, at \$2.58; malleable iron elbows, each, 3-inch, extra heavy, long radius, at \$1.60; 2 $\frac{1}{2}$ -inch, extra heavy, long radius, at \$0.95; 2-inch, extra heavy, long radius, at \$0.60; 1 $\frac{1}{2}$ -inch, standard, long radius, at \$0.16; 1 $\frac{1}{4}$ -inch, extra heavy, long radius, at \$0.46; 1 $\frac{1}{2}$ -inch, extra heavy, at \$0.20; 1 $\frac{1}{4}$ -inch, standard, at \$0.12; 1-inch, standard, at \$0.08; 1-inch, extra heavy, at \$0.15; $\frac{3}{4}$ -inch, extra heavy, at \$0.14; $\frac{1}{2}$ -inch, extra heavy, at \$0.08; cast-iron tees, each, 6 by 6 by 3 $\frac{1}{2}$ inch, standard, reducing, flanged, at \$6.05; 6 by 6 by 1 $\frac{1}{2}$ inch, standard, reducing, flanged, at \$6.05; 6 by 6 by 6 inch, standard, flanged, at \$5.35; 5 by 5 by 5 inch, extra heavy, flanged, at \$6.55; 4 by 4 by 4 inch, extra heavy, flanged, at \$4.95; 4 by 4 by 2 inch, extra heavy, flanged, reducing, at \$5.60; 3 by 3 by 3 inch, extra heavy, flanged, at \$3.55; malleable iron tees, each, 2 $\frac{1}{2}$ by 1 $\frac{1}{2}$ by 2 $\frac{1}{2}$ inch, extra heavy, reducing, at \$0.78; 2 $\frac{1}{2}$ by $\frac{1}{2}$ by 2 $\frac{1}{2}$ inch, extra heavy, reducing, at \$0.78; 2 by 2 by 1 inch, extra heavy, reducing, at \$0.50; 2 by 1 $\frac{1}{2}$ by 1 inch, extra heavy, reducing, at \$0.50; 1 $\frac{1}{2}$ by 1 by 1 inch, extra heavy, reducing, at \$0.38; 1 $\frac{1}{2}$ by 1 $\frac{1}{2}$ by 1 inch, extra heavy, reducing, at \$0.29; 1 $\frac{1}{2}$ by $\frac{1}{2}$ by 1 $\frac{1}{2}$ inch, extra heavy, reducing, at \$0.29; 1 $\frac{1}{2}$ by 1 by 1 $\frac{1}{2}$ inch, standard, reducing, at \$0.29; 1 by 1 by 1 inch standard, at \$0.22; $\frac{1}{2}$ by 1 by 1 inch standard, reducing, at \$0.22; $\frac{1}{2}$ by $\frac{1}{2}$ by $\frac{1}{2}$ inch, extra heavy, at \$0.105; $\frac{1}{2}$ by $\frac{1}{2}$ by $\frac{1}{2}$ inch, extra heavy, at \$0.10; cast-iron crosses, 3 $\frac{1}{2}$ by 2 $\frac{1}{2}$ by $\frac{1}{2}$ inch, extra heavy, at \$1.82 each; cast-iron flanges, each, 6-inch, standard, at \$0.78; 5-inch, extra heavy, at \$1.05; 4-inch, extra heavy, at \$0.83; 3 $\frac{1}{2}$ -inch, extra heavy, at \$0.80; 3-inch, extra heavy, at \$0.64; brass unions, each, 2 $\frac{1}{2}$ -inch, at \$1.74; 2-inch, at \$1.05; 1 $\frac{1}{2}$ -inch, at \$0.72; 1 $\frac{1}{4}$ -inch, at \$0.49; 1-inch, at \$0.37; $\frac{3}{4}$ -inch, at \$0.26; $\frac{1}{2}$ -inch, at \$0.10; gate valves, each, 6-inch medium, rising stems, flanged, at \$23.60; 5-inch medium, rising stems, flanged, at \$19.40; 4-inch medium, rising stems, flanged, at \$14.80; globe valves, each, 3-inch, water cut-off, brass, at \$6.45; 2 $\frac{1}{2}$ -inch, brass, at \$4.45; 2-inch, brass, at \$2.36; 1 $\frac{1}{2}$ -inch, brass, at \$1.56; 1 $\frac{1}{4}$ -inch, brass, at \$1.13; 1-inch, brass, at \$0.80; $\frac{3}{4}$ -inch, brass, at \$0.56; $\frac{1}{2}$ -inch, brass, at \$0.31; 1-inch whistle valve, brass, at \$1.80; 5-inch check valve, iron body, brass mount-

ing, at \$11.60; 2½-inch check valve, brass, at \$4.08; 2-inch check valve, brass, at \$2.11; 1-inch check valve, brass, at \$0.68; 5-inch angle valves, iron body, brass mounting, at \$10.20; 1½-inch stop cocks, brass, at \$1.05; ½-inch stop cocks, brass, at \$0.52; ½-inch drip cocks, brass, at \$0.19; reducer, 5 by 4½ inch, cast iron, extra heavy, at \$7.45; reducer, 4 by 3 inch cast-iron, extra heavy, at \$5.50; 1½-inch stop and waste cock, at \$1.97; gauge cocks, 3-ball, at \$0.40; steam cock, 1½-inch, at \$1.40; drip cock, 1½-inch, at \$1.45; drip cock, 1-inch, at \$0.78; air cocks, ½-inch, at \$0.20; 2½-inch hose connection, with cap, brass, at \$10.50; ½-inch hose bibb cock, brass, at \$0.90; air-pressure gauge, 12-inch dial, at \$12.50; steam-pressure gauge, 12-inch dial, at \$12.50; water-pressure gauge, 6-inch dial, at \$4.50; steam whistle, 5-inch diameter, at \$8.50; exhaust head for 6-inch exhaust, at \$34; wrenches for water supply cut-off valves, at \$1.40; brass gong, 13-inch diameter, connected in place, at \$10.50; brass gong, 6-inch diameter, connected in place, at \$1.25; steel castings, at \$0.05 per pound; iron castings, except cast-iron pipe, at \$0.085 per pound; soft steel boiler pipe, 8-inch flanged bend, breeching and draft pipe, 36-inch diameter, ¼-inch plate, at \$0.185 per pound; medium steel, at \$0.05 per pound; brass chain for whistle and damper, at \$2.50 each; sheet-iron spiral pipe, galvanized, No. 12 BWG, at \$0.15 per pound; sheet-iron spiral pipe, galvanized, with 2 elbows and reducer, No. 14 BWG, at \$0.15 per pound; sheet iron, black, No. 10, for damper and draft pipe, cost included in unit price bid for 3-inch boiler pipe, above; sheet iron, galvanized, No. 14 BWG, for drip pans and splash guards, at \$0.05 per pound; soft copper gaskets, at \$0.35 per pound; brass hub for 3 by 3 by 3 inch tee, for lead-pipe connection, at \$1; 1½-inch, double, extra heavy, lead pipe, at \$0.046 per linear foot; wall pipe support for 6-inch pipe, at \$15.50; wall pipe support for 4-inch pipe, at \$12; wall pipe supports for 2½-inch pipe, at \$4.50; wall pipe supports for 2-inch pipe, at \$4.50; wall pipe supports for 1½-inch pipe, at \$4.25; floor stand-pipe supports for 3½-inch pipe at compressor, at \$4.50; support for 6-inch exhaust pipe, at \$5.50; pipe covering as follows, per linear foot: For 6-inch pipe, at \$0.25; 4-inch pipe, at \$0.185; 3½-inch pipe, at \$0.16; 2-inch pipe, at \$0.12; 1½-inch pipe, at \$0.11; 1¼-inch pipe, at \$0.10; 1-inch pipe, at \$0.09; coverings for pipe fittings, each, for 6-inch pipe, at \$0.57; 4-inch pipe, at \$0.46; 3½-inch pipe, at \$0.38; 3-inch pipe, at \$0.33; 2-inch pipe, at \$0.19; 1½-inch pipe, at \$0.18; 1¼-inch pipe, at \$0.18; 1-inch pipe, at \$0.18; pipe covering for feed water heater, at \$0.25 per square foot.

Date of approval: November 10, 1915.

Date of beginning: November 25, 1915.

Date of expiration: 120 fair working days after November 15, 1915.

Completed.

LOCK AND DAM NO. 31.

The work for constructing this lock and dam was carried on under contract with the Sheridan-Kirk Contract Co., of Charleston, W. Va., dated November 6, 1912.

The river was at a favorable stage for prosecuting the work on July 1, 1915. The construction of pass cofferdam, unwatering of same, excavation of earth and rock for foundation of navigable pass, placing of concrete for 500 linear feet of same, placing of all but three of the necessary horses and props on the foundation, construction of upper guide-wall dirt coffer and unwatering of same were completed before the close of the working season.

The pass cofferdam was flooded by high water once in August, September, October, and November, and finally on December 17, by which time all work within the coffer had been completed and construction work was suspended for the season.

During the winter of 1915-16 some little filling was done in an effort to protect the foot of the esplanade slope. The filling of the esplanade was continued in the spring. The removal of pass cofferdam was begun in May, and up to the close of the fiscal year only the

lower arm had been removed, owing to delays incident to high stages of the river.

The work done during the fiscal year was as follows:

Items.	Designation.	Quantity.	Unit price.
Cofferdam, 18-foot:			
Built.....	Linear feet.....	1,370.00	\$19.55
Removed.....	do.....	418.00	3.45
Common excavation.....	Cubic yards.....	3,405.73	.70
Rock excavation.....	do.....	2,539.81	4.00
Drilling bolt holes.....	Linear feet.....	583.00	.50
Fill.....	Cubic yards.....	20,000.00	.50
Oak timber.....	Feet b. m.....	8.88	100.00
Oak timber, 60 per cent.....	do.....	39.08	60.00
Concrete.....	Cubic yards.....	7,268.82	6.50
Structural steel, placed in work.....	Pounds.....	31,867.65	.026
Reinforcing rods:			
Delivered.....	do.....	6,881.60	.024
Placed in work.....	do.....	6,881.60	.016
Bolts, etc.:			
Delivered.....	do.....	348.75	.033
Placed in work.....	do.....	6,275.03	.622
Iron castings, placed in work.....	do.....	112,758.40	.022
Steel castings, placed in work.....	do.....	44,201.92	.032
Pipe, 4-inch.....	Linear feet.....	800.50	.74
Tile drain.....	do.....	55.00	1.00
Unskilled labor.....	Hours.....	30.00	.25
Skilled labor.....	do.....	2.00	.50

On June 30, 1916, it is estimated that 61 per cent of the work under the first general contract is completed and that the whole work is 45.3 per cent completed.

APPROPRIATIONS.

LOCK AND DAM NO. 31.

July 25, 1912 (allotted Aug. 17, 1912).....	\$330,000.00	
Aug. 1, 1914 (allotted Aug. 5, 1914).....	137,000.00	
Mar. 3, 1915 (allotted Mar. 15, 1915).....	270,000.00	
Mar. 4, 1915 (allotted Apr. 13, 1915).....	110,000.00	
July 27, 1916 (allotted Aug. 1, 1916).....	238,600.00	
	<hr/>	\$1,085,600.00
Transferred to Dam No. 35.....	7,586.91	
		<hr/>
		55,659.23
Net total appropriated and allotted.....		1,029,940.77
Receipts from sales and other sources.....		45.15
		<hr/>
Grand total of receipts from all sources.....		1,029,985.92
Expended on work to June 30, 1916.....	440,141.35	
Balance unexpended July 1, 1916.....	851,244.57	
Appropriated since July 1, 1916.....	238,600.00	
		<hr/>
		1,029,985.92

CONTRACT IN FORCE.

Name of contractor: Sheridan-Kirk Contract Co.

Amount and character of work: \$663,164.89. Constructing Lock and Dam No. 31, Ohio River.

Price per unit: Cofferdam, 18-foot, \$23 per linear foot; cofferdam, 10-foot, \$12 per linear foot; common excavation, \$0.70 per cubic yard; rock excavation, \$3 per cubic yard; drilling bolt holes, \$0.50 per linear foot; fill, \$0.50 per cubic yard; riprap, \$3 per cubic yard; stone paving, \$6 per cubic yard; oak timber, \$100 per 1,000 feet b. m.; reinforced concrete, \$10 per cubic yard; concrete, \$6.50 per cubic yard; concrete paving, \$7 per cubic yard; structural steel, \$0.065 per pound; reinforcing rods, \$0.04 per pound; forgings (including wrought iron), \$0.063 per pound; bolts, etc., \$0.055 per pound; iron castings, \$0.065 per pound;

steel castings, \$0.08 per pound; bronze, \$0.85 per pound; pipe, 5-inch, \$2 per linear foot; pipe, 4-inch, \$1.85 per linear foot; pipe, 3-inch, \$1.50 per linear foot; pipe, 2½-inch, \$1 per linear foot; pipe, 2-inch, \$1 per linear foot; tile drain, \$1 per linear foot.

Date of approval: November 16, 1912.

Date of beginning: November 22, 1912.

Date of expiration: Original contract November 22, 1916, extended by supplemental contract to July 22, 1917.

Supplemental contract approved April 30, 1914, provides approximately 5,000 cubic yards rock excavation, at \$4 per cubic yard.

Per cent of completion: 61.

LOCK AND DAM NO. 33.

The work of constructing the lock and dam has been carried on by the Bates & Rogers Construction Co., of Chicago, Ill., under contract dated February 9, 1915.

From July 1, 1915, to December 31, 1915, the lock cofferdam was flooded six times. The dates of flooding were July 8 and 19, September 8, October 2, November 16, and December 17. When the cofferdam was flooded on December 17, 1915, all construction work was suspended until May 24, 1916, when the lock cofferdam was pumped out. After repairs were made the lock cofferdam was again flooded June 5, 1916, and was still in this condition at the end of the fiscal year.

The masonry of the lock, with the exception of upper and lower miter sills, upper and lower poiree dams, a large portion of the lock chamber paving, seven superstructures and three superstructures in the river and land walls, respectively, was completed during the fiscal year.

The following table shows percentage of masonry of various parts of work finished:

	Per cent.
Upper guide wall.....	2.6
River wall.....	71.8
Land wall.....	84.3
Lock chamber paving.....	16.8
Lock.....	56.6

One footing in upper guide wall adjoining land wall was also finished.

The piling in upper poiree dam and miter sill are about three-fourths driven.

Filling behind land wall and laying 12-inch tile drain were in progress during May and June, 1916.

The river wall crib and a 50-foot section of pass crib adjoining river wall has been placed and filled. About 90 per cent of heavy riprap outside of river wall and river wall crib has been placed.

The construction of navigable pass cofferdam was started on August 21, 1915, but, due to delays and damage incident to the high stages of the river, this cofferdam was not closed until December 17, 1915. During the high water that followed the lower and outer arms of this cofferdam were washed away, the upper arm only remaining.

The following table shows the work done and material placed during the fiscal year.

Item.	Designation.	Quantity.	Unit price.
Common excavation.....	Cubic yards.....	6,942.0	\$.55
Fill.....	do.....	7,772.0	.40
Riprap.....	do.....	3,155.0	4.00
Round piles.....	Linear feet.....	40,153.9	.40
Sheet piles.....	Feet b. m.....	401,406.0	55.00
Common timber.....	do.....	106,968.0	52.00
Deck timber.....	do.....	9,200.0	52.00
Oak timber.....	do.....	676.2	100.00
Reinforced concrete.....	Cubic yards.....	243.2	15.00
Concrete.....	do.....	15,306.3	6.80
Structural steel:			
Delivered.....	Pounds.....	989,124.0	.086
Placed in work.....	do.....	101,743.5	.024
Reinforcing rods:			
Delivered.....	do.....	110,902.0	.08
Placed in work.....	do.....	23,887.7	.02
Forgings:			
Delivered.....	do.....	61,186.0	.036
Placed in work.....	do.....	7,070.0	.024
Bolts:			
Delivered.....	do.....	103,951.0	.036
Placed in work.....	do.....	16,706.0	.024
Iron castings:			
Delivered.....	do.....	311,546.5	.086
Placed in work.....	do.....	35,906.0	.024
Steel castings:			
Delivered.....	do.....	197,984.0	.06
Placed in work.....	do.....	7,774.0	.04
Bronze:			
Delivered.....	do.....	1,362.5	.60
Placed in work.....	do.....	29.0	.40
Pipe:			
6-inch, delivered.....	Linear feet.....	2,314.3	1.66
4-inch.....			
Delivered.....	do.....	2,198.4	1.26
Placed in work.....	do.....	59.0	.60
3-inch, delivered.....	do.....	2,857.2	1.05
2-inch, delivered.....	do.....	323.6	.60
1½-inch, delivered.....	do.....	577.9	.60
1-inch, delivered.....	do.....	720.6	.45
Tile drain.....	do.....	450.0	1.00
Unskilled labor.....	Hours.....	848.0	.30
Skilled labor.....	do.....	306.0	.60
Steel piles:			
Delivered.....	Pounds.....	1,509,544.0	.021
Placed in work.....	do.....	100,472.0	.014
Steel piles, corner and gusset:			
Delivered.....	do.....	22,266.0	.024
Placed in work.....	do.....	950.0	.016
Steel test piles.....	do.....	28,690.0	.017770
Do.....	Number.....	32.0	1.50

On June 30, 1916, it is estimated that 30.9 per cent of the first contract was completed, and that the whole work was 23.1 per cent completed.

APPROPRIATIONS.

LOCK AND DAM NO. 33.

Oct. 2, 1914 (allotted Oct. 14, 1914).....	\$1,140,000.00	
July 27, 1916 (allotted Aug. 1, 1916).....	70,000.00	
		\$1,210,000.00
Transferred to Dam No. 35.....	71,213.87	
Transferred to Dam No. 39.....	11,072.32	
		82,286.19
Net total appropriated and allotted.....		1,27,713.81
Receipts from sales and other sources.....		154.95
		1,27,868.76
Grand total of receipts from all sources.....		1,27,868.76
Expended on work to June 30, 1916.....	309,495.40	
Balance unexpended July 1, 1916.....	748,373.86	
Appropriated since July 1, 1916.....	70,000.00	
		1,27,868.76

CONTRACTS IN FORCE.

Name of contractor: Bates & Rogers Construction Co.

Amount and character of work: \$1,012,554.06; constructing Lock and Dam No. 83, Ohio River.

Price per unit: Cofferdam, standard, \$29 per linear foot; cofferdam, modified, box type, \$19 per linear foot; cofferdam, modified, earth-bank type, \$17 per linear foot; cofferdam, modified, combination type, \$18 per linear foot; common excavation, \$0.55 per cubic yard; fill, \$0.40 per cubic yard; riprap, \$4 per cubic yard; stone paving, \$6 per cubic yard; round piles, \$0.40 per linear foot; sheet piles, \$55 per 1,000 feet b. m.; common timber, \$52 per 1,000 feet b. m.; deck timber, \$52 per 1,000 feet b. m.; oak timber, \$100 per 1,000 feet b. m.; reinforced concrete, \$15 per cubic yard; concrete, \$6.50 per cubic yard; concrete paving, \$7.50 per cubic yard; structural steel, \$0.06 per pound; reinforcing rods, \$0.05 per pound; forgings (including wrought iron), \$0.06 per pound; bolts, etc., \$0.06 per pound; iron castings, \$0.06 per pound; steel castings, \$0.10 per pound; bronze, \$1 per pound; pipe, 6-inch, \$2.75 per linear foot; pipe, 4-inch, \$2.25 per linear foot; pipe, 3-inch, \$1.75 per linear foot; pipe, 2-inch, \$1 per linear foot; pipe, 1½-inch, \$1 per linear foot; pipe, 1¼-inch, \$0.75 per linear foot; tile drain, \$1 per linear foot.

Date of approval: February 15, 1915.

Date of beginning: March 21, 1915.

Date of expiration: Original contract, February 19, 1919, extended by supplemental contract to April 19, 1919.

Supplemental contract approved November 1, 1915, provides for furnishing and driving interlocking steel sheet piling under the dam in lieu of wooden sheet piling, at the following rates: Steel sheet piling at \$0.035 per pound; corner and gusset piles at \$0.04 per pound; cutting off piles at \$1.50 each.

Per cent of completion: 80.9.

LOCK AND DAM NO. 85.

The work of construction of this lock and dam was carried on by the National Contract Co., of Evansville, Ind., under contract dated November 10, 1913.

Supplemental contracts were entered into during the year, as follows:

On October 9, 1915, for driving steel sheet piling in lieu of and where wooden sheet piling had not been driven.

On April 15, 1916, for driving steel sheet piling 5 feet upstream from navigable pass foundation and placing concrete water seal between steel piling and present foundation.

During the working season of 1915 the work was interrupted several times by freshets.

The cofferdam for the first section of the navigable pass was removed. A cofferdam inclosing both the remainder of the navigable pass, 160 feet in length, and the bear traps, was constructed, and all the masonry, fixed parts, and bear-trap leaves were completed.

The steel sheet piling provided for in supplemental contract of October 9, 1915, were driven along the foundation within this cofferdam. The bear-trap cofferdam referred to above was almost completely removed at the end of the fiscal year, and that for the fixed and chanoine weirs started.

The filling for the esplanade was finished and the concrete paving placed thereon.

The following table shows the work done and material placed during the fiscal year:

Item.	Designation.	Quantity.	Unit price.
Cofferdam, 16-foot:			
Constructed.....	Linear feet.....	1,502	\$37.00
Removed.....	do.....	1,164	3.00
Common excavation.....	Cubic yards.....	19,297	.60
Fill.....	do.....	14,469	.50
Riprap.....	do.....	9,887	4.00
Round piles.....	Linear feet.....	29,931	.50
Sheet piles.....	Feet b. m.....	192,974	50.00
Common timber.....	do.....	257,951	70.00
Deck timber.....	do.....	160,200	70.00
Oak timber.....	do.....	61,562	100.00
Reinforced concrete.....	Cubic yards.....	60	25.00
Concrete.....	do.....	12,146	6.85
Concrete paving.....	do.....	1,587	7.50
Structural steel, placed in work.....	Pounds.....	656,259	.028
Reinforcing rods:			
Delivered.....	do.....	1,314	.042
Placed in work.....	do.....	74,046	.028
Forgings and wrought iron:			
Delivered.....	do.....	7,532	.042
Placed in work.....	do.....	19,612	.028
Bolts:			
Delivered.....	do.....	3,570	.042
Placed in work.....	do.....	94,781	.028
Iron castings:			
Delivered.....	do.....	162	.042
Placed in work.....	do.....	139,299	.028
Steel casting, placed in work.....	do.....	128,489	.04
Bronze, placed in work.....	do.....	1,307	.40
Pipe:			
8-inch, placed in work.....	Linear feet.....	285	1.20
4-inch, placed in work.....	do.....	1,161	1.00
3-inch, placed in work.....	do.....	1,895	.80
24-inch, placed in work.....	do.....	56	.60
2-inch—			
Delivered.....	do.....	30	.90
Placed in work.....	do.....	606	.60
14-inch—			
Delivered.....	do.....	84	.60
Placed in work.....	do.....	224	.40
11-inch, placed in work.....	do.....	110	.40
11-inch, placed in work.....	do.....	590	.40
Unskilled labor.....	Hours.....	185	.25
Skilled labor.....	do.....	181	.50
<i>Under first supplemental agreement.</i>			
Steel piling:			
Delivered.....	Pounds.....	1,268,141	.0195
Placed in work.....	do.....	674,521	.013
Corners and gusset piles:			
Delivered.....	do.....	105,204	.0235
Placed in work.....	do.....	61,336	.015
Piling cut off.....	Number.....	80	1.50
<i>Under second supplemental agreement.</i>			
Steel piling, delivered.....	Pounds.....	686,137	.0231
Corners and gussets, delivered.....	do.....	28,500	.0261

On June 30, 1916, it is estimated that 84 per cent of the first contract work is completed and that the whole work is 70 per cent completed.

APPROPRIATIONS.

LOCK AND DAM NO. 35.

Mar. 4, 1913 (allotted July 28, 1913).....	\$219,100.00
Aug. 1, 1914 (allotted Aug. 5, 1914).....	820,000.00
Mar. 3, 1915 (allotted Mar. 15, 1915).....	580,000.00
Mar. 4, 1915 (allotted Apr. 13, 1915).....	95,000.00
July 27, 1916 (allotted Aug. 1, 1916).....	288,000.00
	<hr/>
	\$1,502,100.00
Received by transfer from:	
Dam No. 33 (act Oct. 2, 1914).....	71,218.87
Dam No. 29 (act Mar. 4, 1915).....	39,199.22
Dam No. 31 (act Mar. 4, 1915).....	7,586.91
	<hr/>
	118,000.00
	<hr/>
	1,620,100.00

Transferred to Dam No. 89-----		\$20, 000. 00
Net total appropriated and allotted-----		1, 600, 100. 00
Expended on work to June 30, 1916-----	\$1, 002, 688. 18	
Balance unexpended July 1, 1916-----	309, 411. 82	
Appropriated since July 1, 1916-----	288, 000. 00	
		1, 600, 100. 00

CONTRACTS IN FORCE.

Name of contractor: National Contract Co.

Amount and character of work: \$1,198,878.57; constructing Lock and Dam No. 35, Ohio River.

Price per unit: Cofferdam, 16-foot, at \$30 per linear foot; cofferdam, 10-foot, at \$20 per linear foot; common excavation, at \$0.60 per cubic yard; fill, at \$0.50 per cubic yard; riprap, at \$4 per cubic yard; stone paving, at \$8 per cubic yard; round piles, at \$0.50 per linear foot; sheet piles, at \$50 per 1,000 feet b. m.; common timber, at \$70 per 1,000 feet b. m.; deck timber, at \$70 per 1,000 feet b. m.; oak timber, at \$100 per 1,000 feet b. m.; reinforced concrete, at \$25 per cubic yard; concrete, at \$6.85 per cubic yard; concrete paving, at \$7.50 per cubic yard; structural steel, at \$0.07 per pound; reinforcing rods, at \$0.07 per pound; forgings (including wrought iron), at \$0.07 per pound; bolts, etc., at \$0.07 per pound; iron castings, at \$0.07 per pound; steel castings, at \$0.10 per pound; bronze, at \$1 per pound; pipe, 5-inch, at \$3 per linear foot; pipe, 4-inch, at \$2.50 per linear foot; pipe, 3-inch, at \$2 per linear foot; pipe, 2½-inch, at \$1.50 per linear foot; pipe, 2-inch, at \$1.50 per linear foot; pipe, 1½-inch, at \$1 per linear foot; pipe, 1¼-inch, at \$1 per linear foot; pipe, 1-inch, at \$1 per linear foot; tile drain, at \$1 per linear foot.

Date of approval: November 25, 1913.

Date of beginning: December 29, 1913.

Date of expiration: Original contract November 29, 1917, extended by supplemental contracts to July 29, 1918.

Supplemental contract approved October 30, 1915, provides for furnishing and driving interlocking steel sheet piling under the dam, in lieu of wooden sheet piling, at the following rates: Steel sheet piles, at \$0.0325 per pound; corner and gusset plates, at \$0.0375 per pound; cutting off piles, at \$1.50 each.

Supplemental contract approved April 29, 1916, provides driving additional steel sheet piling at the following rates: Steel sheet piles, at \$0.0385 per pound; corner and gusset piles, at \$0.0435 per pound; cofferdam, 10-foot, at \$20 per linear foot; common excavation, at \$0.60 per cubic foot; transferring riprap, at \$1 per cubic yard; bolts, at \$0.07 per pound; concrete, at \$6.85 per cubic yard; cutting off piles, at \$1.50 each.

Per cent of completion: 84.

LOCK AND DAM NO. 37.

This lock and dam was completed and placed under the appropriation for operating and care of canals on January 1, 1911.

APPROPRIATIONS.

July 13, 1902-----	\$100, 000. 00
Mar. 3, 1903-----	400, 000. 00
Mar. 3, 1905-----	50, 000. 00
Mar. 4, 1907-----	270, 000. 00
May 27, 1908-----	100, 000. 00
Mar. 4, 1909-----	230, 000. 00
June 25, 1910-----	150, 000. 00
Total-----	1, 800, 000. 00

Receipts from sales and other sources.....	\$952. 00
Total	1, 300, 952. 00
Transferred to Dam No. 39 (sundry civil act, June 25, 1910).....	1, 526. 40
Grand total of receipts from all sources.....	1, 299, 425. 60
Expended on work to June 30, 1916.....	1, 299, 425. 60

LOCK AND DAM NO. 39.

Work on construction of Dam No. 39, Ohio River, was continued by hired labor and Government plant. Working conditions during the 1915 season were unfavorable on account of the frequent rises in the river. The lock cofferdam was pumped out on July 23 after the break of May 27, 1915, in the lower arm had been repaired. The lock cofferdam was also flooded for 8 days in October 11 days in November, and from December 17, 1915, to May 17, 1916. Considerable time was lost during these floods in removing plant and equipment, and also in removing sediment after coffer was again unwatered.

Due to the very high stage of the river during the 1915 season, it was very difficult to build the pass cofferdam, and on three occasions the upper arm was entirely washed out, and on another occasion the outer arm was swept away. This cofferdam was finally completed in November of 1915, and some work was accomplished on the navigable pass crib, a 100-foot section of which was decked and filled and a 220-foot section was put in place and partly filled with one and two man stone.

During the winter period of high water the lower arm of pass cofferdam was damaged to such an extent that it was necessary to remove this arm entirely, and on account of high water this section could not be restored. One derrick boat was left inside the lock cofferdam in May, 1916, and has been used to remove sediment from inside of lock chamber and to make necessary excavation for cribs, piling, etc.

The work accomplished from July 1, 1915, to June 30, 1916, was as follows: The necessary excavations were made for upper and lower ends of land and river wall and upper and lower miter sills and poiree dam foundations; round and sheet piling were driven for upper and lower ends of land and river wall and for upper and lower poiree dams and round piling were driven for struts, miter sills, and poiree dam foundations; round and sheet piling were also driven for navigable pass and steel sheet piling were driven below the lower poiree dam; also along upper side of navigable pass; concrete was placed in entire length of river wall, upper end of land wall, and first section on lower end of land wall; concrete was also placed and metal work set for both poiree dams, miter sills, and lock floor remaining about poirees and miter sills; the river-wall crib has been built and filled and about 400 feet of navigable-pass crib is in place, partly filled and decked; the filter bed for permanent water supply was laid and necessary piping thereto was placed in position; tile gauges were set in river wall; and pipe was placed inside of lock chamber for operation purposes.

The following work was done and material placed:

Item.	Designation.	Quantity.
Common excavation.....	Cubic yards.....	14,194.0
Fill.....	do.....	5,899.0
Riprap.....	do.....	3,029.0
Round piling.....	Linear feet.....	27,424.0
Wood sheet piling.....	Feet b. m.....	200,143.0
Steel sheet piling.....	Pounds.....	145,029.0
Common timber.....	Feet b. m.....	116,571.0
Deck timber.....	do.....	14,309.0
Oak timber.....	do.....	5,418.0
Reinforced concrete.....	Cubic yards.....	280.0
Concrete.....	do.....	15,234.0
Structural steel.....	Pounds.....	194,061.0
Reinforcing rods.....	do.....	25,325.1
Forgings.....	do.....	61,426.5
Bolts.....	do.....	25,312.6
Iron castings.....	do.....	72,275.0
Steel castings.....	do.....	15,427.0
Bronze.....	do.....	40.0
Pipe:		
6-inch.....	Linear feet.....	300.5
4-inch.....	do.....	726.2
3-inch.....	do.....	212.7
1½-inch.....	do.....	157.6
Tile drain.....	do.....	740.0
Coffer, 16-foot.....	do.....	882.0

It is estimated that the work on lock and dam is 30.8 per cent completed at close of fiscal year.

APPROPRIATIONS.

LOCK AND DAM NO. 39.

Mar. 4, 1913 (allotted July 28, 1913).....	\$150,000.00	
Oct. 2, 1914 (allotted Oct. 14, 1914).....	150,000.00	
Mar. 4, 1915 (allotted Apr. 13, 1915).....	400,000.00	
July 27, 1916 (allotted Aug. 1, 1916).....	492,000.00	
		\$1, 192, 000.00
Received by transfer from:		
Dam No. 29 (act July 25, 1912).....	19,000.00	
Dam No. 29 (act Mar. 4, 1915).....	11,072.83	
Dam No. 31 (act July 29, 1912).....	37,000.00	
Dam No. 31 (act Mar. 4, 1915).....	11,072.32	
Dam No. 33 (act Oct. 2, 1914).....	11,072.32	
Dam No. 35 (act Mar. 4, 1913).....	20,000.00	
Dam No. 37 (sundry civil act June 25, 1910).....	1,528.40	
Dam No. 7 (act June 23, 1913).....	10,000.00	
Dam No. 16 (act Mar. 4, 1913).....	40,000.00	
Dam No. 17 (act Mar. 4, 1913).....	40,000.00	
Allotted June 8 and 24, 1916 (act Mar. 4, 1915).....	61,000.00	
		261,743.37
Net total appropriated and allotted.....		1, 453, 743.37
Receipts from sales and other sources.....		448.23
Grand total of receipts from all sources.....		1, 454, 191.60
Expended on work to June 30, 1913.....	878,772.12	
Balance unexpended July 1, 1916.....	88,419.48	
Appropriated since July 1, 1916.....	492,000.00	
		1, 454, 191.60

CONTRACTS IN FORCE.

Name of contractor: Louisville Cement Co.
Amount and character of work: \$23,250. Cement for Dam No. 39, Ohio River.

Price per unit: For cement delivered by barge to the site of Dam No. 39, Ohio River, at \$1.55 per barrel; for cement delivered on railroad siding at Carrollton, Ky., at \$1.58 per barrel; rebate of 10 cents on each sack returned.

Emergency contract dated May 1, 1915.

Date of beginning: When ordered.

Date of expiration: December 31, 1915.

Completed.

Name of contractor: William H. Brameler.

Amount and character of work: \$40. Rent of land.

Price per unit: \$10 per year.

Lease dated July 15, 1915.

Date of beginning: March 1, 1915.

Date of expiration: On completion of Dam No. 39.

Name of contractor: Penn Bridge Co.

Amount and character of work: \$6,329.67. Wicket irons for Dam No. 39, Ohio River.

Price per unit: Structural steel, at \$0.0248 per pound; forgings, rivets, etc., at \$0.0328 per pound.

Emergency contract dated November 22, 1915.

Date of beginning: December 2, 1915.

Date of expiration: February 25, 1916.

Completed.

Name of contractor: American Steel Foundries.

Amount and character of work: \$1,219.26. Wicket boxes.

Price per unit: Steel castings, at \$0.0496 per pound.

Date of beginning: December 16, 1915.

Date of expiration: January 22, 1916.

Completed.

CONTINGENCIES.

Work was continued throughout the year by the Ohio River board's designing force on plans for locks and dams.

APPROPRIATIONS.

Mar. 4, 1913 (allotted Apr. 6, 1915)-----	\$10,000.00	
Mar. 4, 1915 (allotted Apr. 13, 1915)-----	36,000.00	
Total appropriated and allotted-----		\$46,000.00
Expended on work to June 30, 1916-----	\$23,327.29	
Balance unexpended July 1, 1916-----	22,672.71	
Total-----		46,000.00

APPROPRIATIONS.

FIRST CINCINNATI DISTRICT, CONSOLIDATED.

Constructing Lock and Dam No. 37:

June 13, 1902-----	\$100,000.00
Mar. 3, 1903-----	400,000.00
Mar. 3, 1905-----	50,000.00
Mar. 4, 1907-----	270,000.00
May 27, 1908-----	100,000.00
Mar. 4, 1909-----	230,000.00
June 25, 1910:	
Lock and Dam No. 29 (allotted July 7, 1910)-----	150,000.00
Lock and Dam No. 37-----	150,000.00
Feb. 27, 1911, Lock and Dam No. 29 (allotted Apr. 7, 1911)-----	52,000.00
Mar. 4, 1911, Lock and Dam No. 29 (allotted Apr. 7, 1911)-----	480,000.00
July 25, 1912:	
Lock and Dam No. 29 (allotted Nov. 4, 1913)-----	50,000.00
Lock and Dam No. 31 (allotted Aug. 17, 1912)-----	330,000.00

Mar. 4, 1913:	
Lock and Dam No. 35 (allotted July 28, 1913)-----	\$219, 100.00
Lock and Dam No. 39 (allotted July 28, 1913)-----	150, 000.00
Contingencies (allotted Apr. 6, 1915)-----	10, 000.00
Aug. 1, 1914:	
Lock and Dam No. 29 (allotted Aug. 5, 1914)-----	99, 000.00
Lock and Dam No. 31 (allotted Aug. 5, 1914)-----	137, 000.00
Lock and Dam No. 35 (allotted Aug. 5, 1914)-----	320, 000.00
Oct. 2, 1914:	
Lock and Dam No. 29 (allotted Oct. 14, 1914)-----	12, 000.00
Lock and Dam No. 33 (allotted Oct. 14, 1914)-----	1, 140, 000.00
Lock and Dam No. 39 (allotted Oct. 14, 1914)-----	150, 000.00
Mar. 3, 1915:	
Lock and Dam No. 29 (allotted Mar. 15, 1915)-----	76, 000.00
Lock and Dam No. 31 (allotted Mar. 15, 1915)-----	270, 000.00
Lock and dam No. 35 (allotted Mar. 15, 1915)-----	580, 000.00
Mar. 4, 1915:	
Lock and Dam No. 29 (allotted Apr. 13, 1915)-----	200, 000.00
Lock and Dam No. 31 (allotted Apr. 13, 1915)-----	110, 000.00
Lock and Dam No. 35 (allotted Apr. 13, 1915)-----	95, 000.00
Lock and Dam No. 39 (allotted Apr. 13, 1915)-----	400, 000.00
Lock and Dam No. 39 (allotted June 8, 1916)-----	28, 000.00
Lock and Dam No. 39 (allotted June 24, 1916)-----	33, 000.00
Contingencies (allotted Apr. 13, 1915)-----	36, 000.00
July 27, 1916:	
Lock and Dam No. 29 (allotted Aug. 1, 1916)-----	23, 900.00
Lock and Dam No. 31 (allotted Aug. 1, 1916)-----	238, 600.00
Lock and Dam No. 33 (allotted Aug. 1, 1916)-----	70, 000.00
Lock and Dam No. 35 (allotted Aug. 1, 1916)-----	288, 000.00
Lock and Dam No. 39 (allotted Aug. 1, 1916)-----	492, 000.00
Total appropriated and allotted-----	7, 519, 600.00
Transferred from other districts (Dams 7, 16, and 17 to No. 39)-----	\$90, 000.00
Transferred to other districts (No. 29 to No. 15)-----	75, 000.00
	<u>15, 000.00</u>
	7, 534, 600.00
Receipts from other sources-----	1, 680.38
Total from all sources-----	7, 536, 280.38
Expended on work to June 30, 1916-----	4, 842, 203.90
Balance unexpended July 1, 1916-----	1, 581, 576.48
Appropriated since July 1, 1916-----	1, 112, 500.00
Total-----	7, 536, 280.38

LOCKS AND DAMS NOS. 41, 43, AND 48, AND SURVEYS, OHIO RIVER.

REPORT OF MAJ. JOHN C. OAKES, CORPS OF ENGINEERS.

LOUISVILLE, KY., DISTRICT.

LOCK AND DAM NO. 41.

New lock and widening canal, south side.—This work is being carried on under a contract with the Ohio River Contract Co. At the end of the working season 1915, the affairs of that company were placed in the hands of a receiver. The receiver, on April 1, 1916, sublet the contract to the T. A. Gillespie Co., of New York, since which date the work has been carried on by the subcontractor.

Lock pit.—The plant employed in rock excavation in the new lock pit consisted of 1 steam shovel, 2 cranes, 5 locomotives, 24 cars, 1 incline hoisting plant, 2 wagon drills, 6 tripod drills, 3 jack-hammer drills, and 4 channelers. During the year 28,979 cubic yards of rock were excavated. The material was loaded into cars by the steam shovel or cranes and removed from the lock pit by the incline hoisting plant. The cars were dumped on adjacent Government or private ground. Holes for blasting were drilled by the tripod and wagon drills about 6 feet apart and about 7 feet deep. The channelers were used to cut the finished wall line in the upper half of the lock (where the bottom of the wall is above the floor of the lock), the back wall lines, and the outlets from the filling culverts into the lock. The excavation has been completed to grade in the south part of the lock for about 300 feet west of the upper gate miter sill. From the middle of the lock to the lower gate recess the rock is from 1 to 3 feet above grade on the south side. North of the center line, throughout the lock, the rock is from 8 to 12 feet above grade.

At the beginning of the 1916 working season, about 20,000 cubic yards of river deposit were found in the lock pit, notwithstanding that a pump dredge worked several weeks before the lock pit was pumped out. The removal of this silt was so difficult and tedious that practically no pay work has been done this season.

Excavation in the dry was continued from July 1, 1915, to December 11, 1915. The lock was flooded by high water December 18, 1915, and was not pumped out again until May, 1916. During the winter a small amount of rock and silt was excavated by the derrick boat and placed as fill behind the south lock wall.

In the north and south lock walls 8,915 cubic yards of plain concrete and 1,669 cubic yards of reinforced concrete were placed. The north wall is complete from the head of the fore-bay to, but not including, the upper gate anchorage. The south wall opposite the section referred to is also complete; then occurs a gap, 35 feet long, in which no concrete has been placed. West of this gap, about 250 feet of the south wall was placed and is complete except for a small trench left out on top in which the rails for the towing locomotive are to be laid later. The upper gate miter sill was completed.

The general method of mixing and placing was as follows: The sand and gravel was brought in barges to the outside of the coffer-dam and were lifted from the barges into a hopper. Side-tilting cars, operated by a hoisting engine, were run under the hopper and hauled the sand and gravel to the storage piles. The track on which the cars run is on top of a partition which separates the sand and gravel piles. From the storage pile to a platform directly over the mixer the material was handled by a measuring car, divided into two compartments, into which the sand and gravel was admitted through gates in the roof of the tunnel. The compartments were designed to contain the correct proportion of sand and gravel for 1 cubic yard of concrete. The cement was delivered from a shed on the bank at the head of the lock to the mixing platform by means of an incline chute. The material was admitted to the 1-cubic yard "cube" mixer through a hopper set in the top of the mixing platform. The concrete was poured from the mixer into bottom-dump buckets, these being hauled on a flat car, by a hoisting engine to a

The status of the work at the close of the fiscal year is as follows:

Lock, including widening the canal, on the south side, but exclusive of lock gates, machinery, power houses, etc.

	Per cent completed
South lock wall.....	71.0
North lock wall.....	48.7
South canal wall.....	71.5
Upper guard wall.....	None.
Lower guard wall.....	39.9
Lower guide wall.....	41.1
Polree dam foundation.....	None.
Miter sills.....	86.3
Esplanade.....	None.
Conduit.....	100.0
Emergency dam.....	None.
Total.....	57.8

The metal work for the emergency dam has been purchased by the United States.

Miscellaneous work done by Government force.—Built and erected forms for power-house foundation, floors, stairway, etc. (the concrete, 241.3 cubic yards, was furnished by the contractor for the locks), erected an experimental accumulator, worked on plans for Stoney gate-valve control, drilled 354 holes for blasting in west approach to the new lock, aggregating 3,105 feet, and continued dredging in the west approach.

Expended (new lock and widening canal, south side).

Contract work.....	\$136,409.36
Inspection and surveying.....	8,254.19
Repairs to roadway.....	90.00
Work on Stoney gate-valve control.....	280.65
Accumulator tests.....	814.86
New power house:	
Labor.....	\$1,546.20
Materials.....	702.16
	2,248.36
Repairs to Twenty-eighth Street Bridge.....	33.20
West approach to new lock:	
Dredging.....	6,066.52
Drilling and blasting.....	1,745.52
Work on cofferdam.....	686.12
Repairs to boats.....	856.85
Compensation to injured employees.....	186.17
	9,491.18
District office and miscellaneous.....	4,419.75
Total.....	162,041.05

Widening the canal on its north side.—The work is being done under contract with the Henry Bickel Co.

Operations under this contract during the year were as follows:

Common excavation.—Two steam shovels and a disposal plant consisting of 5 locomotives, 24 cars, and a spreader were employed at intervals during the year in removing the small quantity of earth left behind the old canal wall and at the lower end of the contract area. Excavated earth remaining along the line of the new wall and

that brought into the excavation by slides were removed by a link belt crane. The material was disposed of in trimming the slopes of the new embankment. The "common excavation" has been about 98 per cent completed.

Rock excavation.—Five Sullivan tripod drills were employed in drilling. After blasting, the disrupted material was removed by a steam shovel in successive cuts about 30 feet in width and 3 to 10 feet deep and approximately 1,000 feet in length. The disposal plant mentioned above was used in hauling and dumping the material as "fill" in the new embankments. At the close of the fiscal year the rock excavation was about 98 per cent completed. A small quantity of material at the lower end of the contract area and the rock in the old north canal wall remain to be excavated.

Channeling.—The small amount of channeling remaining to be done at the close of the preceding fiscal year has been completed.

Plain concrete, new canal wall.—With the exception of a 25-foot opening for the emergency dam at station 15+OC the entire new north wall has been completed from the upper end of the contract area to station 1+OC, a length of 6,135 feet. The work was done with an ordinary mixing and placing plant, a link-belt crane, and three sets of Blaw steel forms. Iron check posts were placed in the wall at the specified locations. The work is about 95 per cent completed.

Macadam roadway.—The roadway on the embankment on the north side of the canal from the Eighteenth Street Bridge to station 10+OC, a distance of 3,000 feet, has been practically completed to subgrade. The road from Eighteenth Street to Tarascon Avenue was widened to 32 feet to provide for the heavy traffic of city ash carts. The road has been about 43 per cent completed.

Removal of old north wall.—To permit the simultaneous prosecution of the work of excavation north of the old wall and the work of removing the part of the wall fronting the area already excavated a cross cofferdam was built between the new and old walls near station 44+OC. On October 5, 1915, a 700-foot section of the old wall failed, causing the flooding of the excavated area behind it. This necessitated moving the cross cofferdam to a point below the break, 1,500 feet downstream from its former location, causing considerable expense and delay. The work of removing the old wall was sublet by the contractor to the Western Rivers Dredging Co. This work is in progress with a steamboat, a drill boat, and two derrick boats. Part of excavated material was loaded on Government barges and removed by Government steamboats for use in the construction of Dam No. 43 and the remainder placed on the south berm of the canal.

Progress.—Owing to unusually inclement weather, high river stages, and the failure of the old canal wall, the contractor was unable to complete the work within the time specified. The time limit of the contract has been waived for a reasonable time. At the close of the fiscal year the contract was about 92 per cent completed.

Following is a monthly summary of the contractor's plant, force, and output during the fiscal year ending June 30, 1916:

Date.	Plant.													Average daily force.	Days suitable for work.	
	Steam shovels.	Drag-line scrapers.	Locomotives.	Cars.	Drills.	Channeled.	Dredging plant. ¹	Concrete plant.	Pumping plants	Spreader.	Air compressors.	Cranes.	Road roller.			Rock crusher.
1915.																
July.....	2	2	5	24	6	2	....	1	1	1	2	1	....	....	121	17
August.....	2	1	5	24	6	2	....	1	1	1	2	1	....	....	156	26
September.....	2	1	5	24	6	2	....	1	1	1	2	1	....	....	280	25
October.....	2	1	5	24	6	2	1	1	1	1	2	1	....	1	104	16
November.....	2	1	5	24	6	2	1	1	1	1	2	1	....	1	125	25
December.....	2	1	5	24	6	2	1	1	1	1	2	1	1	1	101	15
1916.																
January.....	2	1	5	24	6	2	1	1	1	1	2	1	1	1	15	....
February.....	2	1	5	24	6	2	1	1	1	1	2	1	1	1	15	6
March.....	1	1	5	24	6	2	1	1	1	1	2	1	1	1	28	20
April.....	1	1	5	24	6	2	1	1	1	1	2	1	1	1	33	12
May.....	1	....	5	24	6	2	1	1	1	1	2	1	1	1	112	26
June.....	1	....	5	24	6	2	1	1	1	1	2	1	1	1	125	22

Date.	Output.						Per cent completed.
	Common excavation.	Rock excavation.	Channeling.	Plain concrete.	Macadam roadway.	Iron check posts.	
1915.							
July.....	Cu. yds. 3,000	Cu. yds. 7,000	Sq. ft.	Cu. yds. 700	Sq. yds.	No.	75
August.....	.....	15,671	664	1,300	.....	.....	76
September.....	10,000	5,021	1,960	1,361	.....	.....	79
October.....	3,361	5,040	2,094	1,645	.....	.....	82
November.....	1,348	2,422	180	418	.....	.....	83
December.....	8,904	9,211	.....	1,378	1,680	.....	84
1916.							
January.....	1,488	957	.....	200	740	531	86
February.....	.....	170	.....	.....	.....	.....	88
March.....	.....	180	.....	.....	.....	.....	86
April.....	.....	800	.....	.....	.....	.....	91
May.....	.....	7,078	.....	.....	.....	.....	91
June.....	.....	10,724	.....	511	2,693	179	92
Total.....	28,101	64,274	4,896	7,513	5,093	710	.....

¹ 1 dredge, 1 drill boat, 2 derrick boats, 1 supply boat, 1 steamboat, and barges.

The condition of the work at the close of the fiscal year is as follows:

Widening the canal (second contract).

	Per cent completed.
Canal wall	96
Dike	83
Culverts	90
Dry dock culvert.....	100
Retaining wall	100
Bridge pier	100
Emergency dam foundation.....	3
Roadway	0
Abutment for Eighteenth Street Bridge.....	100

Direct lift bridge at Eighteenth Street.—This bridge had been completed by the contractor, the Penn Bridge Co., at the close of the

fiscal year 1915, acceptance of the bridge being deferred pending a satisfactory trial of the bridge. The bridge was accepted and final payment made therefor March 16, 1916.

Cost.

Cost of plans.....	\$3, 500. 00
Contract cost.....	41, 682. 75
Inspection.....	833. 33
Work done by the United States, piers, transmission line, etc.....	1, 612. 06
Total.....	47, 628. 14

Of this amount \$22,488.10 was expended during the fiscal year, and is included in the table of expenditures below.

Miscellaneous work by Government force.—Made concrete posts for fence on roadway west of Eighteenth Street Bridge, repaired canal wall near coal bin, removed the south guard gate of the old lock, repaired Eighteenth Street Bridge, planted grass on the north slope, etc.

Expended (widening the canal on its north side).

Contract work, widening the canal, etc.....	\$113, 417. 20
Direct lift bridge.....	22, 488. 10
Field inspection and surveying.....	7, 367. 42
Fence, west of Eighteenth Street Bridge.....	462. 15
Planting grass on north slope.....	530. 25
Repairs to north roadway.....	398. 38
Repairs to canal wall at coal bin.....	190. 56
Concrete mixer.....	500. 00
District office and miscellaneous.....	4, 636. 29
Total.....	149, 990. 35

The foregoing description of operations, etc., have been extracted from the reports of Asst. Engineer Malcolm Elliott, in local charge of the work of building the new lock and widening the canal on the south side, and of Asst. Engineer Frank I. Louckes, in local charge of the work of widening the canal on its north side.

Summary of net expenditures on account of Lock and Dam No. 41, during the fiscal year 1916, not including outstanding liabilities or contract obligations.

Services.....	\$37, 619. 02
Contract work, lock, etc.....	141, 648. 62
Contract work, widening the canal, north side.....	113, 417. 20
Direct lift bridge.....	21, 693. 20
Guard gates.....	7, 983. 67
Concrete mixer.....	500. 00
Materials, supplies, and miscellaneous.....	3, 625. 76
Total.....	326, 487. 47

APPROPRIATIONS.**DAM NO. 41.****Purchase of stock of canal company :**

May 13, 1826.....	\$100, 000. 00
Mar. 2, 1829.....	133, 500. 00
	\$233, 500. 00
Survey, Falls of Ohio River, Aug. 30, 1852.....	5, 000. 00
Purchase of bonds, etc., May 11, 1874.....	1, 675, 354. 81

CONSTRUCTION OF LOCKS AND DAMS ON THE OHIO RIVER. 2785

Completion of new locks, enlargement of canal, cross dam at head of canal, payment of bonds, etc:

July 25, 1868 (allotment) -----	\$85,000.00	
Apr. 10, 1869 (allotment) -----	178,200.00	
July 11, 1870 (appropriation) -----	250,000.00	
Jan. 18, 1871 (appropriation) -----	200,000.00	
Mar. 3, 1871 (appropriation) -----	250,000.00	
June 10, 1872 (appropriation) -----	300,000.00	
Mar. 3, 1873 (appropriation) -----	100,000.00	
Mar. 3, 1875 (appropriation) -----	100,000.00	
		\$1,463,200.00

Enlargement at head of canal and of basin at lock:

July 5, 1884 -----	300,000.00	
Aug. 5, 1886 -----	150,000.00	
Aug. 11, 1888 -----	150,000.00	
Sept. 19, 1890 -----	60,000.00	
July 13, 1892 -----	60,000.00	
Aug. 18, 1894 -----	60,000.00	
		780,000.00

Allotments for Indiana Chute from appropriations for improving Ohio River:

July 14, 1880 -----	\$10,000.00	
Mar. 3, 1881 -----	50,000.00	
Aug. 2, 1882 -----	35,000.00	
July 5, 1884 -----	10,000.00	
Aug. 5, 1886 -----	20,000.00	
		125,000.00

Appropriations for work on Indiana Chute:

Aug. 11, 1888 -----	15,000.00	
Sept. 19, 1890 -----	25,000.00	
July 13, 1892 -----	35,000.00	
Aug. 18, 1894 -----	20,000.00	
		95,000.00

Net allotment from appropriations for maintenance of river and harbor improvements, act of Apr. 23, 1904 -----

14,545.06

Net allotment from appropriation for improving Ohio River, general improvement, act of Mar. 3, 1905 -----

5,353.80

Appropriations for improving Falls of Ohio River and Indiana Chute, Falls of Ohio River:

June 3, 1896 -----	\$10,000.00	
June 4, 1897 -----	350,000.00	
July 1, 1898 -----	152,250.00	
Mar. 3, 1899 -----	15,000.00	
June 13, 1902 -----	41,000.00	
Mar. 3, 1905 -----	80,000.00	
Mar. 2, 1907 -----	314,000.00	
		962,250.00

Dam No. 41, Ohio River:

June 25, 1910 (allotted June 22, 1910) -----	\$50,000.00	
Feb. 27, 1911 (allotted Apr. 7, 1911) -----	350,000.00	
July 25, 1912 (allotted Apr. 17, 1912) -----	670,000.00	
Aug. 24, 1912 (allotted Oct. 4, 1912) -----	570,000.00	
June 23, 1913 (allotted July 14, 1913) -----	200,000.00	
Aug. 1, 1914 (allotted Aug. 5, 1914) -----	725,000.00	
Mar. 3, 1915 (allotted Mar. 15, 1915) -----	205,000.00	
Mar. 4, 1915 (allotted Apr. 13, 1915) -----	75,000.00	
July 27, 1916 (allotted Aug. 1, 1916) -----	350,000.00	
		3,195,000.00

Dam No. 41, Ohio River—Continued.

Transferred to Dam No. 14.....	\$100,000.00
Transferred to Dam No. 15.....	150,000.00
Transferred to Dam No. 29.....	50,000.00
Transferred to Dam No. 43.....	205,000.00
Transferred to surveys.....	50,000.00
	<u>\$555,000.00</u>

Net total appropriated and allotted for Dam No. 41.....\$2,640,000.00

Net total appropriated and allotted.....7,999,203.17

Receipts from sales and other sources.....¹ 4,041.50

Grand total of receipts from all sources.....8,003,244.67

Expended on work to June 30, 1916:

Building new lock and widening canal (gross).....\$1,601,716.75

Former works, completed (gross).....5,359,203.17

\$6,960,919.92

Balance unexpended, July 1, 1916.....692,324.75

Appropriated since July 1, 1916.....350,000.00

\$8,003,244.67

Net expenditures on work to June 30, 1916:

Building new lock and widening canal.....² 1,598,025.25

Former works, completed.....³ 5,101,075.17

ABSTRACTS OF CONTRACTS.

FIRST CONTRACT.

Name of contractor: The Ohio River Contract Co.

Character, quantity, and unit prices of work.

Cofferdam:	
Elevation, 400.7, 300 linear feet.....	\$12.50
Elevation, 446.7, 200 linear feet.....	40.00
Common excavation, 876,000 cubic yards.....	.35
Rock excavation, 293,000 cubic yards.....	.90
Drilling bolt holes, 4,280 linear feet.....	.50
Fill, 250,000 cubic yards.....	.15
Channeling, 101,300 square feet.....	.15
Riprap, 75 cubic yards.....	1.00
Stone paving, 535 cubic yards.....	4.00
Oak timber, 11,500 feet b. m.....	80.00
Concrete, 65,565 cubic yards.....	4.70
Concrete paving, 1,231 cubic yards.....	7.00
Structural steel:	
303,500 pounds.....	.05
95,064 pounds.....	.08955
Reinforcing rods, 150 pounds.....	.05
Forgings, 33,200 pounds.....	.05
Bolts, etc., 11,000 pounds.....	.05
Iron castings, 45,800 pounds.....	.05
Steel castings, 213,400 pounds.....	.07½
Bronze castings, 60 pounds.....	1.00
Pipe:	
7-inch, 19 linear feet.....	1.50
6-inch, 255 linear feet.....	1.50
5-inch, 780 linear feet.....	1.50

¹ In addition to this amount, dividends on stock to the amount of \$257,778 (not distributable) were received.

² Gross expenditures less \$3,691.50 received from sales.

³ Gross expenditures less \$257,778, cash dividends received and \$350 received from sales.

Pipe—Continued.

4-inch, 1,080 linear feet.....	\$0.75
3-inch, 8,210 linear feet.....	.75
2-inch, 2,000 linear feet.....	.75
Tile drain, 170 linear feet.....	.75
Small power houses, 4.....	1,000.00
Macadam roadway, 10,820 square yards.....	.75
Extra labor under paragraph 21 of specifications:	
Unskilled, per hour.....	.25
Skilled, per hour.....	.50

Date of approval of contract: December 1, 1911.

Date of beginning work: January 6, 1912.

Date of expiration of contract: December 6, 1915. (Extended to Dec. 7, 1916.)

Supplemental agreements modifying the foregoing contract have been entered into as follows:

Cement specifications: Dated July 18, 1912; approved by Chief of Engineers July 31, 1912; approved by Secretary of War August 2, 1912.

Valve shafts (structural steel): Dated September 25, 1912; approved by Acting Chief of Engineers October 2, 1912; approved by Acting Secretary of War October 3, 1912.

Additional material: Dated September 9, 1914; approved by the Chief of Engineers September 16, 1914; approved by the Assistant and Chief Clerk, War Department, September 30, 1914.

The estimated total amount of contract is \$1,219,339.50.

Completed at end of fiscal year, 57.3 per cent.

SECOND CONTRACT.

Name of contractor: Henry Bickel Co.

Character, quantity, and unit prices of work.

Common excavation, 770,000 cubic yards.....	\$0.45
Rock excavation, 205,000 cubic yards.....	.90
Drilling bolt holes, 550 linear feet.....	1.00
Stone paving, 24 cubic yards.....	3.00
Reinforced concrete, 490 cubic yards.....	20.00
Plain concrete, 16,951 cubic yards.....	5.00
Channeling, 48,300 square feet.....	.30
24-inch cast-iron culvert, 385 linear feet.....	8.00
16-inch cast-iron culvert, 24 linear feet.....	6.00
Reinforcing rods, 58,000 pounds.....	.05
Iron check posts, 1,536 pounds.....	.10
Macadam roadway, 12,200 square yards.....	.75

Date of approval of contract: May 1, 1913.

Date of beginning work: June 6, 1913.

Date of expiration of contract: May 6, 1916. (Time limit waived.)

The estimated total amount of contract is \$658,094.60.

Completed at end of fiscal year, 92 per cent.

Name of contractor: American Bridge Co.

Amount and character of work: \$14,948.97, furnishing and erecting one mitering guard gate of two leaves.

Prices per unit: Structural steel, 3.57 cents per pound; cast steel, 7.15 cents per pound; nickel steel, 10.4 cents per pound; forged steel, 5.8 cents per pound; steel, 5.8 cents per pound; cast iron, 6.35 cents per pound; phosphor bronze, 54.3 cents per pound; babbitt, 33 cents per pound; white oak, \$54 per thousand feet, board measure; yellow pine, \$48 per thousand feet, board measure.

Date of approval: July 1, 1915.

Date of beginning work: August 6, 1915.

Date of expiration: January 1, 1916. (Time limit waived.) Percentage of completion at end of fiscal year: 60 per cent.

Name of contractor: Milwaukee Bridge Co.

Amount and character of work: \$23,717.35, furnishing and constructing a swing bridge over the locks of the Louisville & Portland Canal.

Prices per unit: Structural steel, 4.84 cents per pound; cast steel, 10.45 cents per pound; cast iron, 7.15 cents per pound; forged steel, shafting and bolts, 10.45 cents per pound; nickel steel, 14.85 cents per pound; phosphor bronze, 56.65 cents per pound; babblitt, 26.95 cents per pound; electrical equipment complete, \$1,650; operator's house complete, \$550; wooden floor complete, \$1,620.

Date of approval: January 6, 1916.

Date of beginning work: February 11, 1916.

Date of expiration: November 7, 1916.

Percentage of completion at end of fiscal year: None.

LOCK AND DAM NO. 43.

The work is being carried on by hired labor with Government plant.

The operations at the lock site during the fiscal year were under the immediate supervision of Capt. H. S. Hetrick, Corps of Engineers, from July 1, 1915, to March 25, 1916, and under that of Asst. Engineer Camden P. Fortney, from March 26, 1916, to June 30, 1916.

At the beginning of the fiscal year the preliminary work, including the construction of temporary camp buildings, installation of plant and equipment, construction of cofferdams, etc., had been completed, and the permanent work was well under way. The excavation in the cofferdams had been practically completed and the cofferdams unwatered. The work of placing concrete in the land wall began July 3, but had to be discontinued the same day on account of threatening high water. The season has been very unfavorable for active operations. Work in the cofferdams was repeatedly interrupted by high water. The lock cofferdam was flooded for periods as follows: July 3 to 28, August 10 to 18, September 8 to 16, October 3 to 12, November 18 to 29, December 17, 1915 (at this date, there being no prospect for the resumption of operations, work was suspended for the season) and June 3 to 30, 1916. Work in the abutment cofferdam was discontinued on account of high water on July 2, 1915, unwatering began July 30, but the cofferdam was again flooded August 7, and no permanent work was done there until October 7. It was again flooded from November 16 to December 12, and again on December 16, when work was discontinued for the season. Besides the time lost while the cofferdams were flooded, much time was lost and expense incurred in pumping out the cofferdams and in removing and returning plant and materials endangered by the frequent floods. Construction work was vigorously prosecuted when possible. The two brick dwellings were completed early in the year, and the pile driving for land wall, river wall, and lock floor on October 21. When not otherwise engaged, floating plant was utilized in obtaining rock removed from old structures in connection with the work at Dam No. 41. The plant was kept in a thorough state of repair. Work of this nature to the amount of \$4,913.57 was done by the shop force at the Louisville & Portland Canal, where the floating plant was wintered.

The permanent work accomplished during the fiscal year and the total accomplished at the end of the year is shown in the following table:

Items.	Designation.	Total estimated quantity.	Accomplished during fiscal year.		Accomplished to June 30, 1916.	
			Quantity.	Per cent.	Quantity.	Per cent.
Cofferdam:						
18-foot.....	Linear feet.....	6,560			2,280	35
10-foot.....	do.....	1,531			917	60
Excavation.....	Cubic yards.....	100,429	3,006	2	81,566	51
Fill.....	do.....	53,197	28,115	43	28,115	43
Riprap.....	do.....	52,572	2,993	5.7	7,637	14.5
Stone paving.....	do.....	195				
Round piles.....	Linear feet.....	225,990	14,610	7	162,150	72
Sheet piles, wood.....	Feet b. m.....	1,046,400	460,800	44	913,500	87
Common timber.....	do.....	1,169,500	52,600	5	185,950	16
Deck timber.....	do.....	344,705				
Oak timber.....	do.....	28,046	5,050	18	5,050	18
Concrete:						
Plain.....	Cubic yards.....	59,282	29,749	50.5	33,010	56
Reinforced.....	do.....	595	474	80	474	80
Paving.....	do.....	1,981				
Structural steel.....	Pounds.....	755,352	186,509	24.7	186,509	24.7
Sheet-steel piles.....	do.....	2,571,400			238,000	9.3
Reinforcements.....	do.....	168,159	30,247	18	30,247	18
Iron castings.....	do.....	306,919	7,697	2.5	7,697	2.5
Steel castings.....	do.....	178,416	2,782	1.6	2,782	1.6
Forgings.....	do.....	784,445	14,256	1.8	16,616	2.1
Bolts and rods.....	do.....	86,520	4,800	5.6	4,800	5.6
12-inch drain tile.....	Linear feet.....	675	675	100	675	100
Gravel and spalls.....	Cubic yards.....	5,465	300	5.6	495	9
Upper guide wall.....				12.2		12.2
Land wall and esplanade.....				52.6		73.5
Lower guide wall.....				4		37.2
River wall.....				30.6		54.5
Lock floor and sills.....				49.7		93.3
Navigable pass.....				8.9		11.4
Chanoine weir and Pier No. 1.....				0.4		0.5
Abutment, fixed weir, and Pier No. 2.....				8.1		68.4
Total work, exclusive of power house, dwellings, lock machinery, and gates.....				21.3		40.6
Lock-keepers' dwellings.....	Number.....	2		25		100
Road excavation.....	Cubic yards.....	1,135	235	21	1,135	100
Sewers, excavation.....	do.....	2,400			2,400	100

Summary of net expenditures on account of Lock and Dam No. 43 during the fiscal year 1916, not including outstanding liabilities or contract obligations.

Services.....	\$180,376.32
Pay, commutation of quarters, and mileage.....	2,140.74
Compensation to injured employees.....	4,842.45
Subsistence supplies.....	17,886.69
Ice.....	1,263.29
Steel piles.....	34,850.62
Lumber.....	16,638.98
Cement.....	30,711.55
Fuel.....	14,795.96
Machinery and tools.....	8,115.79
Miscellaneous materials, supplies, etc.....	45,330.61

366,853.00

Less amounts deducted on pay rolls as follows:

Rent of houses furnished employees.....	\$154.00
Stores sold to employees.....	4,263.06

4,417.06

Total net expenditures..... 862,535.94

COLLECTIONS.

Oct. 5, 1915, Carlton Allen, house rent..... \$2.67

This amount was covered into the Treasury of the United States as "Miscellaneous receipts."

APPROPRIATIONS.

DAM NO. 48.

July 25, 1912 (allotted Aug. 17, 1912).....	\$550,000.00	
July 25, 1912 (allotted Aug. 19, 1914).....	205,000.00	
Mar. 4, 1913 (allotted June 12, 1913).....	30,000.00	
Oct. 2, 1914 (allotted Oct. 14, 1914).....	100,000.00	
Mar. 4, 1915 (allotted Apr. 13, 1915).....	467,000.00	
July 27, 1916 (allotted Aug. 1, 1916).....	490,000.00	
Net total appropriated and allotted.....		\$1,842,000.00
Receipts from sales and other sources.....		29.15
Grand total of receipts from all sources.....		1,842,029.15
Expended on work to June 30, 1916..... ¹	\$1,216,907.69	
Balance unexpended July 1, 1916.....	135,121.46	
Appropriated since July 1, 1916.....	490,000.00	
Total.....		1,842,029.15

CONTRACTS IN FORCE.

Name of contractor: Kosmos Portland Cement Co.
 Amount and character of work: \$37,500; American Portland cement.
 Prices per unit: F. o. b. barges Kosmosdale, Ky., \$1.30 per barrel; f. o. b. cars at Pilchers, Ky., \$1.52 per barrel; empty sacks not returned, 10 cents each.
 Date of approval: May 12, 1916.
 Date of beginning work: June 19, 1916.
 Date of expiration: January 1, 1917.
 Percentage of completion at the end of fiscal year: None.

LOCK AND DAM NO. 48.

The principal work is being carried on by contract and minor work by day labor.

First contract.—Construction work was carried on intermittently during the working season of 1915, the season being very unfavorable for work on account of the high stage of the river. Work during the present season had not been renewed at the close of the fiscal year. The progress under this contract is indicated by the following table, which shows the "pay" quantities of work done and materials delivered during the year, with total accomplishment to June 30, 1916:

¹ Net expenditures to June 30, 1916, \$1,216,878.54.

Item.	Unit.	Quantity.	Done during fiscal year 1916.	Total to June 30, 1916.
Cofferdam:				
20-foot, 50 per cent	Linear feet	7,100		2,723.3
20-foot, 35 per cent	do.		2,723.3	2,723.3
10-foot, 50 per cent	do.	3,500		2,520.0
10-foot, 35 per cent	do.			369.0
Common excavation	Cubic yards	196,452	3,802.0	90,159.0
Fill	do.	68,617	1,711.0	68,034.0
Bltrap.	do.	82,809	6,769.0	17,350.0
Stone paving	do.	186		186.0
Round piles	Linear feet	215,700	1,590.0	104,729.0
Do.	do.	75,000	66,510.0	74,970.0
Sheet piles	Feet b. m.	911,700	11,600.0	794,557.0
Common timber	do.	1,248,937		156,408.0
Deck timber	do.	483,774	55,480.0	63,080.0
Oak timber	do.	27,335		2,481.0
Reinforced concrete	Cubic yards	183		183.0
Concrete	do.	59,077	9,072.0	37,597.0
Concrete paving	do.	1,380		
Structural steel:				
Delivered	Pounds	662,756		662,756.0
Placed	do.			233,976.0
Steel sheet piles:				
Delivered	do.	4,497,622		4,497,622.0
Placed	do.			798,531.0
Reinforcing rods:				
Delivered	do.	96,079	6,461.0	102,540.0
Placed	do.		1,460.0	20,047.0
Forgings:				
Delivered	do.	779,597		779,597.0
Placed	do.		101.0	20,254.0
Bolts, etc.:				
Delivered	do.	168,821		168,821.0
Placed	do.		2,400.0	40,292.0
Iron castings:				
Delivered	do.	321,468		321,468.0
Placed	do.			44,307.0
Steel castings:				
Delivered	do.	151,309		151,309.0
Placed	do.			15,288.0
Bronze:				
Delivered	do.	38		38.0
Placed	do.			38.0
Pipe:				
6-inch	Linear feet	300	197.0	197.0
4-inch	do.	450	165.0	201.5
2½-inch	do.	223	166.0	306.0
2-inch	do.	575	40.0	40.0
Tile drain	do.		850.0	850.0
Unskilled labor	Hours		270.0	270.0

The status of the work at the close of the fiscal year was as follows:

	Per cent complete.
Upper guide wall	37
Upper recess and gate track	95
Land wall and esplanade	89
Lower recess and gate track	95
Lower guide wall	81
Lock floor	100
River wall	98
Navigable pass	0
Chanoine weir and piers	0
Fixed weir	2
Abutment	100
Four brick dwellings	100
Navigable pass wickets (203)	100
Weir wickets (153)	100

2792 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1916.

Summary of net expenditures on account of Lock and Dam No. 48 during the fiscal year 1916, not including outstanding liabilities or contract obligations.

Contract work.....		\$188, 790. 64
Inspection, etc.:		
Services	\$7, 370. 12	
Subsistence supplies.....	709. 11	
Other supplies, etc.....	432. 72	
		8, 511. 95
Total.....		197, 302. 59

APPROPRIATIONS.

DAM NO. 48.

June 25, 1910 (allotted June 22, 1910).....	\$50,000. 00	
Feb. 27, 1911 (allotted Apr. 7, 1911).....	435, 000. 00	
Mar. 4, 1913 (allotted June 9, 1913).....	30, 000. 00	
June 23, 1913 (allotted July 14, 1913).....	116, 000. 00	
Aug. 1, 1914 (allotted Aug. 5, 1914).....	430, 000. 00	
Mar. 3, 1915 (allotted Mar. 15, 1915).....	354, 000. 00	
Mar. 4, 1915 (allotted Apr. 13, 1915).....	589, 000. 00	
July 27, 1916 (allotted Aug. 1, 1916).....	406, 000. 00	
Total.....		2, 410, 000. 00
Expended on work to June 30, 1916.....	1, 022, 355. 32	
Balance unexpended July 1, 1916.....	981, 644. 68	
Appropriated since July 1, 1916.....	406, 000. 00	
Total.....		2, 410, 000. 00

CONTRACTS IN FORCE.

Name of contractor: The Ohio River Contract Co.

Character, quantities, and unit prices of work.

Cofferdam:		
20-foot, 7,100 linear feet.....		\$35. 00
10-foot, 3,500 linear feet.....		15. 00
Common excavation, 190,953 cubic yards.....		. 75
Fill, 69,617 cubic yards.....		. 40
Riprap, 82,809 cubic yards.....		3. 50
Stone paving, 186 cubic yards.....		7. 00
Round piles, 74,790 linear feet.....		. 75
Round piles, 206,830 linear feet.....		. 50
Sheet piles, 1,285,674 feet b. m.....		80. 00
Common timber, 1,248,937 feet b. m.....		60. 00
Deck timber, 483,774 feet b. m.....		60. 00
Oak timber, 27,335 feet b. m.....		80. 00
Reinforced concrete, 183 cubic yards.....		12. 00
Concrete, 60,718 cubic yards.....		7. 00
Concrete paving, 1,380 cubic yards.....		8. 00
Structural steel, 589,818 pounds.....		. 07
Steel sheet piles, 4,454,600 pounds.....		. 05
Reinforcing rods, 95,755 pounds.....		. 07
Forgings, 724,464 pounds.....		. 07
Bolts, etc., 168,821 pounds.....		. 07
Iron castings, 321,097 pounds.....		. 07
Steel castings, 140,389 pounds.....		. 07
Bronze, 88 pounds.....		1. 00

Pipe:

5-inch, 280 linear feet-----	\$2. 50
4-inch, 110 linear feet-----	2. 50
3-inch, 575 linear feet-----	2. 00
2½-inch, 190 linear feet-----	1. 50
2-inch, 575 linear feet-----	1. 50
Tile drain, 860 linear feet-----	. 75
Extra labor, under paragraph 21 of specifications:	
Unskilled-----per hour--	. 25
Skilled-----do-----	. 50

Date of approval of contract: November 2, 1911.

Date of beginning work: December 10, 1911.

Date of completion of contract: November 10, 1916.

Supplemental agreements modifying the foregoing contract have been entered into as follows:

Delivery of metal parts—Dated February 17, 1912; approved by Chief of Engineers March 8, 1912; approved by Secretary of War March 11, 1912.

Cement specifications—Dated July 18, 1912; approved by Chief of Engineers July 31, 1912; approved by Secretary of War August 2, 1912.

Steel piling, riprap, etc.—Dated April 15, 1913; approved by Chief of Engineers April 24, 1913; approved by Secretary of War April 26, 1913.

Horses, props, service-bridge trestles, and Poiree trestles and setting wickets—Dated October 17, 1913; approved by Chief of Engineers October 28, 1913; approved by Secretary of War October 30, 1913.

Steel sheet piling under the dam, increasing thickness of lock floor, and number of round piles—Dated March 3, 1914; approved by Chief of Engineers March 17, 1914; approved by Secretary of War, March 18, 1914.

Estimated total of contract as modified, \$1,874,125.17.

Completed at end of fiscal year: 41 per cent.

OHIO RIVER SURVEYS, ETC.

The work has been carried on by day labor. At the close of the fiscal year the surveys of all the lock sites and the general survey of the Ohio River from Pittsburgh to the mouth, including the maps, were completed, and the land for all of the sites was purchased except abutment site No. 45 and sites Nos. 49, 50, 51, and 54. The map of the general survey consists of 280 charts (scale, 1 inch=500 feet) and an index map, one sheet (scale, 1 inch=6 miles).

During the year 60 charts of the map were inked, and considerable work was done in connection with tabulating and filing survey data for future reference. The map is being photolithographed by the Lake Survey office. Gauging stations were established at Bowling Green, Rochester, Rockport, and Dundee, Ky., and daily gauge readings were taken at those stations. Minor repairs were made to a fuel boat, which was converted into a drill boat and to survey equipment by the shop force at the Louisville & Portland Canal at a cost of \$361.98. The grounds and buildings of the repair station at Paducah, Ky., were maintained, and five lock sites were purchased during the year.

EXPENDED.

Services:

Engineering, mapping, and office work-----	\$15,412.95	
Repair station at Paducah, Ky-----	1,440.00	
Repairs to drill boat, etc-----	233.45	
		\$17,086.40
Mileage and traveling expenses-----		518.81
Establishing and maintaining gauging stations-----		881.73
Photolithographing charts-----		9,234.69
Miscellaneous supplies and expenses-----		502.65

Purchase of sites:

Dam No. 36—			
Land	\$2,800.00		
Recording deed	1.75		
		\$2,801.75	
Dam No. 40—			
Land		1,125.00	
Dam No. 44—			
Land	4,000.00		
Recording deeds	3.00		
Notarial fees	5.00		
		4,008.00	
Dam No. 45—			
Recording deed		1.20	
Dam No. 46—			
Land		2,600.00	
Dam No. 47—			
Land	2,000.00		
Copy of lease	1.25		
		2,001.25	
			\$12,537.20
Total			40,760.98

APPROPRIATIONS.

SURVEYS, PURCHASE OF SITES, ETC.

June 25, 1910 (allotted June 22, 1910)	\$150,000.00	
Feb. 27, 1911 (allotted Apr. 7, 1911)	30,000.00	
Feb. 27, 1911 (allotted Dec. 29, 1911)	25,000.00	
Feb. 27, 1911 (allotted Apr. 19, 1912)	25,000.00	
July 25, 1912 (allotted Aug. 17, 1912)	250,000.00	
July 25, 1912 (allotted Apr. 21, 1915)	1,788.00	
Oct. 2, 1914 (allotted Oct. 14, 1914)	46,000.00	
Mar. 4, 1915 (allotted Apr. 13, 1915)	53,000.00	
		\$580,788.00
Withdrawn for allotment elsewhere		7,495.55
Net total appropriated and allotted		573,292.45
Receipts from sales and other sources		359.95
Grand total of receipts from all sources		573,652.40
Expended on work to June 30, 1916	560,710.11	
Balance unexpended July 1, 1916	12,942.29	
		\$573,652.40

COMMERCIAL STATISTICS.

Lockages from Jan. 1 to Dec. 31, 1915.

LOCK NO. 1.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats	200	193	61	65	519
Towboats	1,367	1,246	755	760	4,046
Government boats	85	34	31	31	131
Coal barges	1,538	1,413	614	958	4,003
Coal boats	694	363	353	456	1,806
Other barges	13	4	14	16	47
Flats	5,674	5,096	1,529	1,635	14,513
Small craft	438	465	329	180	1,212
Total	9,789	9,413	3,524	4,071	26,797

Lockages	2,297
Trips through pass	1,296

¹ Net expenditures to June 30, 1916, \$560,350.16.

Lockages from Jan. 1 to Dec. 31, 1915—Continued.

LOCK NO. 2.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	150	149	73	72	444
Towboats.....	1,308	1,189	508	509	3,414
Government boats.....	27	29	20	19	95
Coal barges.....	2,279	2,247	1,013	1,198	6,237
Coal boats.....	616	373	351	479	1,819
Other barges.....	13	2	13	20	48
Rafts.....			335	306	641
Flats.....	4,769	4,715	419	572	10,475
Small craft.....	389	337	42	39	827
Total.....	9,421	9,091	2,774	3,214	24,500

Lockages..... 3,046
Trips through pass..... 1,198

LOCK NO. 3.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	140	143	74	76	433
Towboats.....	962	940	521	532	2,966
Government boats.....	22	23	17	15	77
Coal barges.....	975	817	578	539	3,205
Coal boats.....	585	370	384	482	1,801
Other barges.....	11	2	11	20	44
Rafts.....	433	474	125	98	1,130
Flats.....	3,670	3,783	1,199	1,267	9,924
Small craft.....	189	213	32	38	472
Total.....	6,967	6,769	2,909	3,377	20,062

Lockages..... 2,463
Trips through pass..... 1,232

LOCK NO. 4.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	124	124	67	67	382
Towboats.....	207	181	214	233	835
Coal barges.....	815	133	502	797	1,746
Coal boats.....	248	12	284	415	910
Other barges.....	9	32	8	20	69
Rafts.....	73	52	212	192	529
Flats.....	446	408	185	343	1,382
Small craft.....	162	192	36	47	437
Total.....	1,584	1,134	1,458	2,114	6,280

Lockages..... 685
Trips through pass..... 611

Lockages from Jan. 1 to Dec. 31, 1915—Continued.

LOCK NO. 5.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	114	113	71	74	372
Towboats.....	230	230	243	244	946
Government boats.....	21	20	12	12	65
Coal barges.....	330	228	528	852	1,938
Coal boats.....	205	5	335	402	947
Other barges.....	10	2	18	19	47
Flats.....	475	444	411	546	1,876
Small craft.....	161	207	34	42	444
Total.....	1,558	1,239	1,647	2,191	6,635

Lockages..... 928
Trips through pass..... 723

LOCK NO. 6.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	105	103	76	75	360
Towboats.....	119	103	198	195	615
Government boats.....	15	13	7	9	44
Coal barges.....	296	220	561	816	1,883
Coal boats.....	222	5	816	409	952
Other barges.....	12	2	15	18	47
Flats.....	304	262	376	514	1,456
Small craft.....	276	292	98	112	773
Total.....	1,349	1,000	1,635	2,143	6,127

Lockages..... 881
Trips through pass..... 519

LOCK NO. 8.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	99	97	79	80	355
Towboats.....	71	47	171	183	472
Government boats.....	8	9	5	4	26
Coal barges.....	218	55	555	915	1,743
Coal boats.....	165	.....	323	389	877
Other barges.....	10	.....	17	22	49
Flats.....	151	60	279	408	967
Small craft.....	139	153	40	60	419
Total.....	861	430	1,478	2,070	4,839

Lockages..... 529
Trips through pass..... 638

Lockages from Jan. 1 to Dec. 31, 1915—Continued.

LOCK NO. 11.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	95	95	85	85	355
Towboats.....	95	75	176	203	549
Government boats.....	11	9	1	1	22
Coal barges.....	229	39	471	909	1,648
Coal boats.....	186	5	350	394	935
Other barges.....	286	236	307	516	1,345
Small craft.....	85	78	25	55	244
Total.....	990	537	1,399	2,143	5,089

Lockages..... 570
Trips through pass..... 581

LOCK NO. 13.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	182	182	211	190	765
Towboats.....	126	111	215	232	687
Government boats.....	10	10	1	1	22
Coal barges.....	169	69	557	925	1,730
Coal boats.....	122	.....	375	499	926
Other barges.....	125	101	238	414	922
Rafts.....	19	19	10	11	59
Small craft.....	194	229	15	18	456
Total.....	947	721	1,685	2,280	5,633

Lockages..... 937
Trips through pass..... 890

LOCK NO. 18.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	142	128	101	113	484
Towboats.....	158	147	233	230	768
Government boats.....	8	10	7	5	30
Coal barges.....	117	36	836	1,252	2,241
Coal boats.....	80	2	334	337	853
Other barges.....	118	128	155	142	543
Rafts.....	1	1	2	2	5
Small craft.....	150	206	43	35	437
Total.....	773	670	1,761	2,167	5,371

Lockages..... 874
Trips through pass..... 693

Lockages from Jan. 1 to Dec. 31, 1915—Continued.

LOCK NO. 26.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	259	250	334	330	1,223
Towboats.....	147	103	306	326	579
Government boats.....	5	.....	7	8	30
Coal barges.....	1,106	326	1,867	2,608	5,807
Coal boats.....	92	.....	328	425	345
Other barges.....	103	48	326	427	904
Flats.....	106	36	71	140	338
Rafts.....	.....	6	.....	221	227
Small craft.....	98	111	79	92	375
Total.....	1,911	880	3,365	4,627	10,788

Lockages..... 855
Trips through pass..... 1,555

Lockages from Aug. 17 to Dec. 31, 1915.

LOCK NO. 28.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	132	126	103	90	451
Towboats.....	107	87	94	122	410
Government boats.....	3	1	5	3	13
Coal barges.....	660	158	553	847	2,223
Coal boats.....	.....	14	.....	.....	14
Other barges.....	177	87	143	151	558
Rafts.....	3	29	.....	124	156
Small craft.....	77	79	26	25	217
Total.....	1,169	591	929	1,372	4,061

Lockages..... 630
Trips through pass..... 453

Lockages from Jan. 1 to Dec. 31, 1915.

LOCK NO. 37.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	115	110	416	416	1,067
Towboats.....	53	44	353	359	808
Government boats.....	10	11	29	26	76
Coal barges.....	181	58	1,791	2,078	4,106
Coal boats.....	6	.....	394	397	797
Other barges.....	67	95	440	502	1,104
Rafts.....	8	4	1	63	76
Small craft.....	268	328	700	758	2,083
Total.....	708	650	4,133	4,899	10,089

Lockages..... 679
Trips through pass..... 3,058

Lockages from Jan. 1 to Dec. 31, 1915—Continued.

LOCK NO. 41.

Kind of boat.	Through lock.		Through pass.		Total.
	Up.	Down.	Up.	Down.	
Passenger boats.....	234	223	14	67	533
Tow boats.....	559	484	65	74	1,132
Government boats.....	462	493	19	31	995
Coal barges.....	301	702	31	72	1,106
Coal boats.....	245	335	36	36	706
Other barges.....	492	331	6	18	1,017
Small craft.....	213	332	7	13	615
Total.....	2,506	3,178	178	301	6,163
Lockages.....					2,447
Trips through pass.....					476

Summary.

Articles.	Downstream commerce.					Pass and open river.			
	Tons.	Lock.		Value.	Tons.	Ton-miles.	Average haul.	Value.	Miles.
		Ton-miles.	Average haul.						
Beer.....	59.6	13,794	230	\$2,384.00	292.9	18,085	77	\$10,516.99	77
Brick.....	985.0	159,220	165	3,688.00	5,781.0	118,040	20	18,499.20	20
Coal.....	1,502,430.0	237,730,324	152	3,091,890.00	3,091,890.2	702,381,594	224	6,013,124.00	224
Cement.....	830.3	57,204	69	5,932.10	2,188.0	79,438	28	20,498.40	28
Coke.....	28.6	10,626	371	1,716.00	15.0	5,593	55	3,810.00	55
Copperage.....					11.0	538	49	2,640.00	49
Cotton.....	166.0	39,655	129	49,800.00	359.6	710	47	2,890.00	47
Cotton seed.....	1,797.0	215,200	120	44,995.00	4,260.0	42,377	118	107,880.00	118
Dry goods.....	30.8	2,650	76	1,540.00	1,284.9	2,471,192	584	105,760.00	584
Fertilizers.....	40.0	2,680	520	40.00	16,157.5	178,550	80	81,745.00	80
Flour.....	408.0	107,655	263	40,900.00	1,575.0	518,522	329	181,578.00	329
Furniture.....								157,500.00	
Grain.....	102.4	4,665	46	2,764.80	7,694.7	985,195	128	207,764.90	128
Corn.....	28.6	1,870	76	731.60	1,174.9	21,374	122	5,421.80	122
Oats.....	31.2	6,880	219	1,372.80	2,074.2	438,954	212	91,264.80	212
Wheat.....	38.7	1,892	52	1,033.20	1,932.6	16,363	123	4,773.00	123
Other.....	471.0	82,528	175	70,680.00	4,809.8	222,611	46	721,470.00	46
Groceries.....	3.8	953	251	95.00	37.7	1,936	51	942.50	51
Hardware.....	848.0	213,777	262	42,400.00	1,732.3	179,041	103	86,615.00	103
Hay, feed, and straw.....	116.0	5,024	43	2,900.00	2,251.2	181,770	81	56,280.00	81
Hides.....	20.3	4,428	213	5,684.00	28.3	3,299	126	7,264.00	126
Hoop poles.....					398.0	125,100	316	5,148.00	316
Iron and steel, manufactured.....	4,497.0	547,368	169	224,850.00	14,226.5	7,435,332	522	711,315.00	522
Iron ore.....	100.0	6,200	62	450.00	70.0	1,090	16	370.50	16
Lath.....	1.3	56	42	19.50	24.7	9,274	38	315.00	38
Leather.....	15.8	240	300	720.00	4	205	513	360.00	513
Lime.....		2,993	189	205.40	542.9	38,361	71	7,007.70	71
Live stock.....									
Cattle.....	198.0	16,593	110	16,560.00	1,221.1	191,285	167	146,882.00	167
Hogs.....	2.2	360	156	345.00	830.5	64,061	80	130,076.00	80
Horses and mules.....	206.5	56,960	281	72,180.00	2,805.5	65,587	23	1,090,960.00	23
Sheep.....	2.0	78	39	240.00	157.7	11,383	72	16,624.00	72
Swine.....	2,200.0	390,466	164	22,000.00	49,395.8	2,627,993	51	495,968.00	51
Lamb.....	2,570.0	354,030	138	51,400.00	20,797.9	406,775	64	415,958.00	64
Machinery.....	688.0	103,548	138	63,500.00	1,097.0	269,136	139	167,768.00	139

Merchandise, miscellaneous.....	19,794.0	4,290,357	216	1,483,900.00	67,878.0	9,841,411	146	5,068,300.00
Molasses.....	112.9	10,140	80	11,700.00	38.3	8,204	309	3,390.00
Oil.....	688.0	119,894	176	17,075.00	1,689.5	182,061	10	48,307.50
Oil-well supplies.....	358.0	94,567	270	38,800.00	689.0	90,412	87	88,300.00
Paint.....	197.0	44,887	228	28,440.00	84.0	22,000	270	10,000.00
Peanuts.....	.5	68	126	50.00	1.22	81	46	10,125.00
Poultry.....	6.3	288	46	2,620.00	488.9	68,046	146	174,300.00
Produce, farm.....	152.4	22,487	147	12,102.00	1,468.0	74,483	51	117,440.00
Salt.....	27,249.8	808,376	33	272,468.00	7,088.1	1,927,124	272	70,881.00
Sand and gravel.....	88,807.5	678,262	8	38,448.00	372,487.5	6,049,876	16	148,976.00
Shingles.....	2.3	94	41	57.50	1,877.0	227,281	144	86,485.00
Spokes.....	1.3	68	52	31.20	2.18	281	131	48.00
Staves.....	9,732.5	2,189,444	226	9,732.50	9.0	1,661,068	1	216.00
Stone.....	268.2	47,288	145	30,894.00	70,045.3	1,046,890	22	70,046.80
Sugar.....					412.3	516	212	48,476.00
Tallow.....					1.77	268	106	206.78
Tanbark.....					20.0	80	6	240.00
Ties, railroad.....	31.0	5,940	191	7,440.00	14,400.0	27,000	2	73,000.00
Tobacco.....					1,694.6	53,491	33	282,704.00
Wool.....	880.3	819,864	332	352,120.00	6.0	83,205	51	8,840.00
Whisky.....	11,960.0	6,912,441	879	1,198,000.00	268.3	68,083	280	116,125.00
Miscellaneous.....					28,769.0	2,792,748	118	2,376,500.00
Total.....	1,678,763.0	265,728,663	192	7,226,379.00	3,714,688.24	742,298,267	200	19,812,184.66

Summary—Continued.

Articles.	Upstream commerce.				Pass and open river.				Grand total.		
	Look.				Tons, miles, and value.				Tons.	Ton-miles.	Value.
	Tons.	Ton-miles.	Average haul.	Value.	Tons.	Ton-miles.	Average haul.	Value.			
Beer.....	104.5	30,546	276	\$4,180.00	1,211.3	185,480	Miles	\$48,452.00	1,638.3	256,905	\$65,532.00
Birds.....	3.5	708	214	10.56	1,633.0	46,413	82	1,709.00	7,922.3	323,351	23,567.36
Cash.....	750.0	491,930	651	1,438.00	31,940.0	21,178	52	63,680.00	4,541,671.0	940,028,036	9,083,124.00
Cement.....	2,080.0	156,421	74	14,482.00	2,533.5	193,116	57	23,800.00	17,677.0	478,099	94,304.00
Cattle.....	2.1	9,395	215	2.46	3,574.0	193,082	77	3,800.00	6,612.1	107,463	19,201.46
Cattle.....	40.6	9,395	215	2,436.00	3,574.0	193,082	77	3,800.00	6,612.1	107,463	19,201.46
Cattle.....	202.5	263,376	124	45,600.00	1,005.0	13,260	36	30,800.00	713.6	272,615	35,260.00
Cattle.....	137.6	25,320	184	41,250.00	1,005.0	13,260	36	30,800.00	713.6	272,615	35,260.00
Cattle.....	284.6	46,067	166	7,150.00	1,704.0	68,373	284	70,200.00	1,620.0	13,260	35,260.00
Cattle.....	83.4	13,167	260	2,630.00	1,704.0	68,373	284	70,200.00	1,620.0	13,260	35,260.00
Cattle.....	366.0	108,279	260	36,600.00	3,277.0	428,547	131	327,700.00	5,627.0	1,183,603	1,023,567.00
Cattle.....	1,227.8	82,041	73	38,430.00	19,204.6	971,680	50	520,954.20	28,320.5	2,053,581	764,808.50
Cattle.....	94.3	244,949	9	2,965.00	1,776.5	61,354	80	28,885.50	1,055.3	85,547	33,624.30
Cattle.....	2,076.0	5,230	113	1,863.00	1,776.5	61,354	80	28,885.50	1,055.3	85,547	33,624.30
Cattle.....	13.6	5,230	15	57,000.00	6,987.0	1,104,788	133	12,275.80	5,017.7	267,069	260,376.00
Cattle.....	380.0	5,230	226	57,000.00	6,987.0	1,104,788	133	12,275.80	5,017.7	267,069	260,376.00
Cattle.....	12.5	1,438	115	312.50	6,171.4	11,267	88	1,046,650.00	12,627.8	1,408,721	1,897,130.00
Cattle.....	364.0	844,169	223	18,200.00	2,043.0	181,867	89	102,150.00	4,897.3	659,218	249,385.00
Cattle.....	6,141.0	844,169	138	183,625.00	6,033.2	48,263	80	151,530.00	14,641.1	1,515,216	364,038.00
Cattle.....	33.8	1,022	400	498.40	6,033.2	48,263	80	151,530.00	14,641.1	1,515,216	364,038.00
Cattle.....	112.0	24,300	218	5,600.00	1,823.8	64,225	146	3,704.60	721.8	185,583	28,383.40
Cattle.....	13.0	24,300	15	58.80	1,823.8	64,225	146	3,704.60	721.8	185,583	28,383.40
Cattle.....	1.7	577	231	1,688.00	148.0	1,513	36	91,440.00	20,068.5	8,108,015	1,063,215.00
Cattle.....	682.8	132,822	200	79,536.00	3,184.8	757,720	338	382,646.00	5,210.7	1,098,430	625,284.00
Cattle.....	1,774.5	179,149	139	191,175.00	4,094.0	504,882	138	614,260.00	6,172.5	747,449	925,545.00
Cattle.....	266.8	25,670	80	129,068.00	854.8	76,115	87	307,043.00	4,216.1	228,809	1,517,745.00
Cattle.....	2,000.0	409,221	144	26,000.00	15,692.6	2,450,280	138	186,920.00	69,897.8	89,004	67,114.00
Cattle.....	91,469.0	91,469	137	629,374.00	14,761.7	1,416,589	96	200,324.00	69,897.8	89,004	67,114.00
Cattle.....	126.0	31,269	137	17,800.00	2,863.6	1,128,589	47	260,300.00	5,064.8	25,584,586	1,584,584.00

Merchandise, miscellaneous.....	17,556.0	2,935,848	111	1,316,700.00	51,046.0	7,013,774	137	3,928,450.00	135,902.0	24,089,570	11,697,150.00
Grain.....	122.8	461,995	27	12,280.00	1,562.6	884,442	535	169,200.00	1,867.6	1,894,781	186,760.00
Oil.....	141.1	88,744	327	3,727.50	1,333.8	100,625	75	33,345.00	1,867.6	441,314	96,185.00
Oil-well supplies.....	31.0	110,219	426	2,400.00	832.0	33,359	49	83,200.00	2,147.0	390,857	214,700.00
Paint.....	24.0	6,466	209	3,720.00	194.0	18,645	160	14,860.00	436.0	92,658	52,320.00
Peanuts.....	1.1	18	180	10.00	1.62	135	83	102.00	3.44	207	344.00
Poultry.....	684.9	209,666	306	373,960.00	867.0	165,100	133	342,900.00	1,984.1	488,700	793,940.00
Products, farm.....	3,276.9	786,808	240	262,362.00	3,021.2	422,976	140	241,696.00	7,921.5	1,306,721	633,720.00
Salt.....	14.0	2,590	185	262,140.00	1,049.5	122,275	117	10,495.00	35,401.4	2,945,364	354,014.00
Sand and gravel.....	1,260,832.0	20,914,833	17	500,340.80	178,958.0	3,467,624	19	71,853.20	1,890,865.0	31,110,634	786,342.00
Shingles.....	2.5	547	219	50.00	1,745.1	1,599,601	91	43,637.50	3,324.4	337,004	83,110.00
Spokes.....	26.491.0	1,942,550	658	9.60	622.0	1,000,000	44	456,000.00	22,804.65	1,828,000	456,000.00
Staves.....	28.9	19,109	76	25,491.00	27,503.7	602,961	106	14,928.00	632.7	66,083	15,184.80
Stone.....	1	18	661	3,408.00	1,123.9	167,466	22	27,563.70	132,853.5	6,296,043	132,853.50
Sugar.....	1	18	180	17.50	2.1	176	149	134,808.00	1,823.3	321,324	218,796.00
Tallow.....	7,751.0	266,340	34	88,755.00	13,592.5	315,925	84	367.50	3.97	487	694.75
Timber, railroad.....	3,027.2	839,394	277	726,528.00	1,546.5	87,907	23	67,962.50	35,743.5	609,265	178,717.50
Tobacco.....	1	4	40	64.00	2.0	142	57	371,160.00	6,199.3	986,732	1,867,832.00
Wool.....	748.8	138,133	184	299,520.00	1,125.3	124,467	71	1,280.00	8.1	451	5,184.00
Whisky.....	11,767.3	2,973,631	253	1,176,730.00	65,144.7	5,763,650	111	450,120.00	3,049.7	650,517	1,219,860.00
Miscellaneous.....	1,372,590.6	64,961,039	47	6,253,838.32	580,425.96	32,442,236	104	5,514,470.00	102,621.0	18,442,470	10,262,100.00
Total.....							200	17,614,855.95	7,346,357.8	1,095,423,095	50,906,170.52

Downstream commerce:

Lock—											
Passenger.....											
Passenger-miles.....		874,538									833,140
Average haul.....		4,258,026									17,986,699
Passenger-miles.....		5									26
Pass and open river—											
Passenger.....											
Passenger-miles.....		304,128									1,919,331
Average haul.....		12,077,780									34,281,168
Passenger-miles.....		40									1,928,824.57
Upstream commerce:											
Lock—											
Passenger.....											
Passenger-miles.....		57,650									986,410.47
Average haul.....		3,908,723									8137,604,744.20
Passenger-miles.....		66									3,068,024
Passenger-miles.....											1,549,012

Upstream commerce—Continued.

Pass and open river—											
Passenger.....											
Passenger-miles.....											
Average haul.....											
Passenger-miles.....											
Grand total:											
Passenger.....											
Passenger-miles.....											
Ferries:											
Tons.....											
Ton-miles.....											
Value.....											
Passenger.....											
Passenger-miles.....											

APPROPRIATIONS.

LOUISVILLE DISTRICT CONSOLIDATED.

Purchase of stock of canal company:		
May 13, 1826	\$100,000. 00	
Mar. 2, 1829	133,500. 00	
		\$233,500. 00
Survey, Falls of Ohio River, Aug. 30, 1852		
		5,000. 00
Purchase of bonds, etc., May 11, 1874		
		1,675,354. 31
Completion of new locks, enlargement of canal, cross dam at head of canal, payment of bonds, etc.:		
July 25, 1868 (allotment)	85,000. 00	
Apr. 10, 1869 (allotment)	178,200. 00	
July 11, 1870 (appropriation)	250,000. 00	
Jan. 18, 1871 (appropriation)	200,000. 00	
Mar. 3, 1871 (appropriation)	250,000. 00	
June 10, 1872 (appropriation)	300,000. 00	
Mar. 3, 1873 (appropriation)	100,000. 00	
Mar. 3, 1875 (appropriation)	100,000. 00	
		1,463,200. 00
Enlargement at head of canal and of basin at lock:		
July 5, 1884	300,000. 00	
Aug. 5, 1886	150,000. 00	
Aug. 11, 1888	150,000. 00	
Sept. 19, 1890	60,000. 00	
July 13, 1892	60,000. 00	
Aug. 18, 1894	60,000. 00	
		780,000. 00
Allotments for Indiana Chute from appropriations for improving Ohio River:		
July 14, 1880	10,000. 00	
Mar. 3, 1881	50,000. 00	
Aug. 2, 1882	35,000. 00	
July 5, 1884	10,000. 00	
Aug. 5, 1886	20,000. 00	
		125,000. 00
Appropriations for work on Indiana Chute:		
Aug. 11, 1888	15,000. 00	
Sept. 19, 1890	25,000. 00	
July 13, 1892	35,000. 00	
Aug. 18, 1894	20,000. 00	
		95,000. 00
Net allotment from appropriations for maintenance of river and harbor improvements, act of Apr. 28, 1904		
		14,545. 06
Net allotment from appropriation for improving Ohio River, general improvement, act of Mar. 3, 1905		
		5,353. 80
Appropriations for improving Falls of Ohio River and Indiana Chute, Falls of Ohio River:		
June 3, 1896	\$10,000. 00	
June 4, 1897	350,000. 00	
July 1, 1898	152,250. 00	
Mar. 3, 1899	15,000. 00	
June 13, 1902	41,000. 00	
Mar. 3, 1905	80,000. 00	
Mar. 2, 1907	314,000. 00	
		962,250. 00
June 25, 1910:		
Lock No. 41 (allotted June 22, 1910)		50,000. 00
Lock and Dam No. 48 (allotted June 22, 1910)		50,000. 00
Surveys, etc. (allotted June 22, 1910)		150,000. 00
Feb. 27, 1911:		
Lock No. 41 (allotted Apr. 7, 1911)		350,000. 00
Lock and Dam No. 48 (allotted Apr. 7, 1911)		435,000. 00
Surveys, etc. (allotted Apr. 7, 1911)		80,000. 00

July 25, 1912:		
Lock No. 41 (allotted Aug. 17, 1912)-----		\$870,000.00
Lock and Dam No. 48 (allotted Aug. 17, 1912)-----		550,000.00
Surveys, etc. (allotted Aug. 17, 1912)-----		250,000.00
Aug. 24, 1912, Lock No. 41 (allotted Oct. 4, 1912)-----		570,000.00
Mar. 4, 1913:		
Lock and Dam No. 43 (allotted June 12, 1913)-----		30,000.00
Lock and Dam No. 48 (allotted June 9, 1913)-----		30,000.00
June 23, 1913:		
Lock No. 41 (allotted July 14, 1913)-----		200,000.00
Lock and Dam No. 48 (allotted July 14, 1913)-----		118,000.00
Aug. 1, 1914:		
Lock No. 41 (allotted Aug. 5, 1914)-----		725,000.00
Lock and Dam No. 48 (allotted Aug. 5, 1914)-----		480,000.00
Oct. 2, 1914:		
Lock and Dam No. 43 (allotted Oct. 14, 1914)-----		100,000.00
Surveys, etc. (allotted Oct. 14, 1914)-----		48,000.00
Mar. 8, 1915:		
Lock No. 41 (allotted Mar. 15, 1915)-----		205,000.00
Lock and Dam No. 48 (allotted Mar. 15, 1915)-----		354,000.00
Mar. 4, 1915:		
Lock No. 41 (allotted Apr. 13, 1915)-----		75,000.00
Lock and Dam No. 43 (allotted Apr. 13, 1915)-----		467,000.00
Lock and Dam No. 48 (allotted Apr. 13, 1915)-----		589,000.00
Surveys, etc. (allotted Apr. 13, 1915)-----		53,000.00
July 27, 1916:		
Lock No. 41 (allotted Aug. 1, 1916)-----		350,000.00
Lock and Dam No. 48 (allotted Aug. 1, 1916)-----		490,000.00
Lock and Dam No. 48 (allotted Aug. 1, 1916)-----		406,000.00
Total appropriated and allotted-----		13,180,203.17
Transferred to other districts (from No. 41 to Nos. 14, 15, and 29)-----	300,000.00	
Withdrawn for allotment elsewhere-----	5,707.55	
		805,707.55
Net total appropriated and allotted-----		12,824,495.62
Receipts from sales and other sources-----		¹ 4,480.60
Total receipts from all sources-----		12,828,926.22
Expended on work to June 30, 1916-----	9,760,893.04	
Balance unexpended July 1, 1916-----	1,822,033.18	
Appropriated since July 1, 1916-----	1,246,000.00	
Total-----		12,828,926.22

¹ In addition to this amount, dividends on stock of Louisville & Portland Canal to the amount of \$257,778 (not disburseable) were received.

OPERATING AND CARE OF LOCKS AND DAMS ON THE OHIO RIVER.

REPORT OF THE DISTRICT OFFICERS HAVING CHARGE OF SLACK-WATER IMPROVEMENT OF THE OHIO RIVER.

LOCKS AND DAMS.

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FOR DESCRIPTION OF THESE IMPROVEMENTS, SEE PAGES 1214 TO 1215.

LOCKS AND DAMS NOS. 1 TO 10, OHIO RIVER.

REPORT OF LIEUT. COL. FRANCIS R. SHUNK, CORPS OF ENGINEERS.

PITTSBURGH, PA., DISTRICT.

At the headwaters of the Ohio River the year was notable for the exceptional frequency of moderate rains and rises which necessitated frequent maneuvers of the movable dams and caused them to continue in raised position for less than the average number of days. In consequence of these conditions the open river below provided a navigable stage for packets and light towboats, with but little assistance from water released from the movable-dam pools. While the addition of new dams and consequent lengthening of the series of dams has necessitated greater caution in the care and manipulation of the structures, nevertheless no unusual difficulties were experienced in maintaining and operating the locks and dams during the year. Necessarily the more frequent maneuvering of the movable dams results in an increase in the number of breakages of the movable parts, particularly in the older and poorly adapted structures above the mouth of Beaver River. Accordingly, because of the increased rainfall, a

special effort was made to reduce the number of downward maneuvers of the chanoine wickets, which was successfully accomplished by lowering sections of the navigable passes so as to discharge materially greater rises. The experiment was successful and satisfactory in every way.

On October 31, 1915, Dam No. 10 was raised for the first time, and thereafter was operated as occasion required and stage of water permitted. Including Pool No. 1 in the Allegheny River and Pool No. 11, Ohio River, in the Wheeling district, a continuous movable-dam slackwater navigation now exists for a length of 83 miles. The 10 movable structures in operation during the entire year were repeatedly lowered simultaneously without special difficulty.

Except at Dams Nos. 1, 2, and 3, no more than the usual number of breakages of wickets, horses and props, horse boxes, lock-operating parts and machinery, etc., occurred and their repairs were made by the operating forces at the various structures. At Dams Nos. 1, 2, and 3 the steel movable parts are greatly deteriorated and the operating conditions are unusually difficult, resulting in an excess of breakages. At all of the dams extra movable parts, according to probable needs, are kept constantly on hand ready for immediate installation from time to time as emergencies arise.

To prevent the danger of further undermining of lock and dam foundations, 54 carloads of large, rough derrick stone were procured to be delivered at Lock No. 5 and there transferred to boats and distributed to Dams Nos. 1, 4, 5, 6, and 9. Stone were placed either at the bear-trap gates or alongside the river lock wall on the downstream side of the dam to receive the discharge from the emptying valves. Since the completion of Lock and Dam No. 5, in 1907, there has been a gradual filling in of the channel for more than one-half mile below the lower lock approach. In 1915 these deposits finally reduced the navigable pool depth to about 7.5 feet. In July a Government dredging plant proceeded to the removal of these deposits, completing the work early in September. Forty-three thousand one hundred and forty-five cubic yards of gravel were taken out and deposited against the bank immediately below the abutment. After removing also 4,430 cubic yards of gravel at the culvert intakes of bear-trap piers at Dam No. 6 the dredging plant on September 16 proceeded to Lock No. 10, Ohio River, there to dredge the lock approaches.

As usual the operating forces at the various structures performed the ordinary repairs to all machinery, floating plant, buildings, movable parts of dams, etc., cleaned and painted the lock gates and all exposed irons on the locks and bear-trap piers above the water line, painted the floating plants, interior and exterior woodwork, and tin work of lock-keeper houses, etc. At Lock No. 1, during the winter, the force installed the machinery, derricks, capstans, etc., on six steel maneuver-boat hulls for the Pittsburgh, Wheeling, and Cincinnati districts, and painted the boats. It also assembled and constructed the extra wickets for the movable dams in this district. In the summer of 1915 it became evident that the wooden maneuver-boat hulls at Dams Nos. 3, 4, and 5 could not be depended upon for another season's wicket maneuvers. Accordingly materials were purchased for their reconstruction, being delivered at Lock No. 6, where the operating force, assisted by a few men from Locks Nos. 5 and 7,

constructed during the winter months new wooden hulls and assisted in transferring the machinery from the old boats and reinstalled it on the new ones. In making important repairs such as the replacing of lock gate tracks at Locks Nos. 2 and 3, in order that the work might be expedited and performed in the most economical manner, all men that could be spared from the operating forces of the various dams were utilized.

A contract was let for steel light towers for Locks Nos. 6 and 8, but owing to the difficulty in procuring materials the contractor had not completed them at the end of the year. Bids were solicited and the contract let for electric-lighting plants for Ohio River maneuver boats at Dams Nos. 1, 3, 4, 5, 6, and 8. The new steel hull boats in service at Dams Nos. 2, 7, 9, and 10 were equipped with such lighting plants when constructed. Twenty-three Chanoine wickets, 29 horses, and 42 props were procured for Dams Nos. 1 to 6, inclusive, and a new $1\frac{1}{2}$ cubic yard clamshell bucket for use on the derrick boat. A carload of needles for closing the spaces between Chanoine wickets on the various dams was purchased.

Owing to the height of the movable dam sill at Dam No. 2, several loaded barges ascending the river collided with Chanoine wickets, in some instances seriously injuring the movable parts of the dam and occasionally sinking the vessels. This difficulty, it is believed, will become worse as the channel scours deeper below the dam, and can only be remedied by lowering the navigable pass sill at least 1.5 feet. Unless this structure is eliminated through the erection of the new dam at Emsworth, it is probable that the lowering of the navigable pass foundation in the near future will become imperative.

The following table shows the maneuvers of Dams Nos. 1 to 10, inclusive, during the year:

Raised.	Lowered.	Days up.	Raised.	Lowered.	Days up.
Dam 1:			Dam 3—Continued.		
Up at beginning of year.	July 10, 1915.....	10	Oct. 23, 1915.....	Nov. 16, 1915.....	24
July 17, 1915.....	Aug. 5, 1915.....	19	Nov. 25, 1915.....	Dec. 17, 1915.....	22
Aug. 9, 1915.....	Oct. 2, 1915.....	54	May 16, 1916.....	May 18, 1916.....	2
Oct. 9, 1915.....	Oct. 20, 1915.....	11	May 23, 1916.....	June 4, 1916.....	12
Oct. 23, 1915.....	Nov. 16, 1915.....	24	June 29, 1916.....	Up at end of year..	2
Nov. 19, 1915.....	Dec. 17, 1915.....	28	Total.....		155
May 15, 1916.....	May 18, 1916.....	3			
May 23, 1916.....	June 4, 1916.....	12	Dam 4:		
June 29, 1916.....	Up at end of year..	2	Up at beginning of year.	July 10, 1915.....	10
Total.....		163	July 16, 1915.....	Aug. 5, 1915.....	20
Dam 2:			Aug. 9, 1915.....	Oct. 2, 1915.....	54
Up at beginning of year.	July 10, 1915.....	10	Oct. 9, 1915.....	Oct. 20, 1915.....	11
July 16, 1915.....	Aug. 5, 1915.....	20	Oct. 23, 1915.....	Nov. 16, 1915.....	24
Aug. 9, 1915.....	Oct. 2, 1915.....	54	Nov. 19, 1915.....	Dec. 17, 1915.....	28
Oct. 10, 1915.....	Oct. 20, 1915.....	10	May 22, 1916.....	June 4, 1916.....	13
Oct. 23, 1915.....	Nov. 16, 1915.....	24	June 29, 1916.....	Up at end of year..	2
Nov. 20, 1915.....	Dec. 17, 1915.....	27	Total.....		162
May 14, 1916.....	May 18, 1916.....	4			
May 23, 1916.....	June 4, 1916.....	12	Dam 5:		
June 29, 1916.....	Up at end of year..	2	Up at beginning of year.	July 10, 1915.....	10
Total.....		163	July 21, 1915.....	Aug. 4, 1915.....	14
Dam 3:			Aug. 10, 1915.....	Oct. 2, 1915.....	53
Up at beginning of year.	July 10, 1915.....	10	Oct. 9, 1915.....	Oct. 20, 1915.....	11
July 17, 1915.....	Aug. 5, 1915.....	19	Oct. 23, 1915.....	Nov. 16, 1915.....	24
Aug. 9, 1915.....	Oct. 2, 1915.....	54	Nov. 19, 1915.....	Dec. 17, 1915.....	28
Oct. 10, 1915.....	Oct. 20, 1915.....	10	May 23, 1916.....	June 3, 1916.....	11
			June 30, 1916.....	Up at end of year..	1
			Total.....		192

Raised.	Lowered.	Days up.	Raised.	Lowered.	Days up.
Dam 6:			Dam 8:		
Up at beginning of year.	July 10, 1915.....	10	Up at beginning of year.	July 10, 1915.....	10
July 21, 1915.....	Aug. 4, 1915.....	14	July 21, 1915.....	Aug. 4, 1915.....	14
Aug. 10, 1915.....	Oct. 2, 1915.....	53	Aug. 10, 1915.....	Oct. 2, 1915.....	53
Oct. 10, 1915.....	Oct. 19, 1915.....	9	Oct. 10, 1915.....	Oct. 20, 1915.....	10
Oct. 24, 1915.....	Nov. 16, 1915.....	23	Oct. 24, 1915.....	Nov. 16, 1915.....	23
Dec. 4, 1915.....	Dec. 17, 1915.....	13	Dec. 6, 1915.....	Dec. 17, 1915.....	11
June 30, 1916.....	Up at end of year..	1			
Total.....		123	Total.....		121
Dam 7:			Dam 9:		
Up at beginning of year.	July 10, 1915.....	10	Up at beginning of year.	July 10, 1915.....	10
July 21, 1915.....	Aug. 4, 1915.....	14	July 21, 1915.....	Aug. 4, 1915.....	14
Aug. 10, 1915.....	Oct. 2, 1915.....	53	Aug. 10, 1915.....	Oct. 2, 1915.....	53
Oct. 10, 1915.....	Oct. 20, 1915.....	10	Oct. 10, 1915.....	Oct. 20, 1915.....	10
Oct. 24, 1915.....	Nov. 16, 1915.....	23	Oct. 24, 1915.....	Nov. 16, 1915.....	23
Dec. 4, 1915.....	Dec. 17, 1915.....	13	Dec. 6, 1915.....	Dec. 17, 1915.....	11
June 30, 1916.....	Up at end of year..	1			
Total.....		124	Total.....		121
			Dam 10:		
			Oct. 31, 1915.....	Nov. 13, 1915.....	23

Lock and Dam 1.—By a judicious distribution of serviceable parts and careful manipulation of the Chanoine wickets, the movable dam was maintained and operated, generally fulfilling its functions as conditions required, notwithstanding the dilapidated and badly deteriorated condition of the majority of the steel parts of the structure. In the fall of 1915 the service bridge pertaining to weir No. 3, in use almost exclusively for regulation of the pool, became so weak as to preclude its retention during another entire season. Accordingly a contract was let to the Independent Bridge Co., of Pittsburgh, for a set of new service bridge trestles. However, their fabrication is being greatly delayed through the contractor's difficulty in procuring the delivery of materials.

Under favorable water conditions there were removed from the navigable pass and weirs 17 wickets, 16 horses, 4 props, and 1 horse box. These were replaced by serviceable parts. Two trestles in the weir service bridge were straightened and reinstalled. One hundred and seventy-four flues were installed in the maneuver-boat boiler, a broken valve stem was repaired, a new brick floor laid in the blacksmith shop, the worn-out porch roof on lock-keeper house was replaced with asbestos-protected steel roofing, slight repairs were made to the wooden crest of the dam across the back channel at Davis Island, a flat load of large stone was placed below weir No. 3 to prevent further scour, a hand capstan was installed on the maneuver boat, 60 cubic yards of gravel and stone were removed from the upper lock approach at the mouth of the surface drainage sewer serving a considerable area back of the lock.

The firm of Krantz & McCoy, of Pittsburgh, excavators and disposers of excavated materials, continued the delivery of waste materials by water to the Government reservation on Davis Island. During the year 24,553 cubic yards were placed on the island, materially increasing the area of the raised portion of the 15-acre tract owned by the Government.

Lock and Dam 2.—As heretofore, this was the most difficult of the movable dams to operate and maintain. The operations of the

wooden bear-trap gate, 102 feet 6 inches wide, from which the 18-inch raising strip was removed during the previous year, were comparatively satisfactory, and in consequence no further steps were taken to replace it with a steel gate. Two horse boxes, 7 horses, 4 props, 7 wickets, and some quoins, which had become unserviceable, were removed and replaced with serviceable parts. Additional new pins were placed in the filling and emptying valves of the locks. The upstream gate chain-drum bearing was reset. New wooden decks were constructed on the lock gates. A new basement floor was laid in the power house. A 4-foot cubical section of river wall at the upper lock gate bearing was removed and reconstructed.

With the exercise of considerable care the lower rail on the upper lock-gate track was made to serve until the final lowering of the dam in the fall of 1915. In April a Poiree cofferdam was constructed at the upper lock gate. The water having subsided sufficiently the inclosure was unwatered on May 1, the old rail and surrounding concrete removed, and the new rail assembled, anchored, and concreted into place on the 7th. After two days exposure of the concrete the cofferdam was removed and the lock put into service.

Lock and Dam 3.—The repairs to the movable parts of this dam were unusually large, owing to the inexpediency of attending to them at the proper time in the fall of 1915. There were removed and replaced by serviceable parts during the year 17 horse boxes, 16 horses, 18 props, 12 wickets, and numerous quoins. New flues were installed in the maneuver-boat boiler. Two new Morse chains were procured for the main power plant. New pins were placed in some of the lock valves. The piston heads in 32 valve-operating jacks were turned down and repacked with leather cups. A new drive shaft was installed on the original upper lock-gate engine. Six hundred linear feet of water line were laid on the esplanade. The Ohio River pump-boat boiler was repaired and the pumps overhauled by the operating force at this structure. An oil-pipe line was laid on river wall of lock.

On October 23 one of the bear-trap gates was operated with great difficulty. A later examination indicated the existence of a hole in the concrete foundation under the lower leaf hinge. To repair the hole is hardly practicable without the use of an expensive cofferdam. However, the gate has since operated satisfactorily. On November 19 a strong downstream windstorm overturned the needle flat, which drifted underneath the maneuver boat, delaying the raising of the dam one day. The services of a steamboat were required to remove the flat. No damage resulted.

The lock-gate engines at this structure, which were admittedly unsatisfactory when originally installed, finally reached a condition necessitating their replacement. Accordingly two new gate engines were procured under contract and installed in April. The concrete recess walls around the gate engines were raised.

The lower rail on the upper gate track at this lock barely served to perform its function until the close of the season of 1915. In the early part of May a Poiree cofferdam was constructed. The inclosure was unwatered on May 9, the old rail and surrounding concrete removed, a new rail, previously procured, assembled, anchored, and concreted into place, the work being completed on the 14th. After one

day's exposure of the concrete the Poiree dam was removed and the lock put in service.

Lock and Dam 4.—The usual number of repairs were made to the movable parts and operating machinery of the lock and dam during the year. Two defective horse boxes, 6 horses, 7 props, 6 wickets, and 14 quoins were taken out and replaced with serviceable parts. All of the piston heads of the 32 valve-operating jacks on the river wall of the lock were turned down and repacked with leather cups. Three broken valve stems were replaced by new ones and 16 keys and 38 pins placed in lock valves. A broken valve-operating jack was replaced by a new one. The bearings of the lower lock gate chain drum were rest. A new Morse chain was procured and installed on the operating plant. A new service pump was installed in the basement of power house, a new water line laid to the supply tank, and new cooling pipes installed in the air compressor. Repairs were made to one of the bear-trap valves. Three cracked gas-engine cylinder heads were repaired by the Pittsburgh Reinforced Brazing Co. and two main bearings on one of the compressors rebabbitted by the Blaisdell Machinery Co. Material repairs were made to the upper lock-gate engine, which is operating unsatisfactorily.

For some time the lower end of the river lock wall has been settling perceptibly, finally causing a dangerous break across the wall at the bearing of the lower lock gate, and two heavy steel anchor bands were procured and placed around the end of the wall to prevent further settlement.

When the stage of water was favorable for raising the dam on May 14 a serious break occurred in the 5-foot water main of the Jones & Laughlin Steel Co., at Woodlawn. To avoid a suspension of the steel company's entire plant the movable dam was permitted to remain down until after the rise of the 17th, when the water main had been repaired.

Although the lower rail of the lower lock-gate track has become badly worn, examination by diver indicated that it will probably perform its functions satisfactorily during the season of 1917.

Lock and Dam 5.—As usual the repairs required at this lock and dam were comparatively unimportant. Four horses, 3 props, and 3 wickets, which had become defective, were replaced by serviceable parts. Also 10 wicket boxes were replaced and 18 quoins. The piston heads of the valve-operating oil jacks were turned down and repacked with leather cups. Two new snubbing posts were installed on the river wall of the lock. The yard derrick used for transferring materials from rail to river was reconstructed and a new tramway built between the derrick and the lower guide wall. A concrete coal-storage bin 15 by 20 by 6 feet in depth was constructed. A set of new tubes was installed in the maneuver-boat boiler. New wooden decks were erected on the lock gates. The workshop at this structure was rebuilt. Six carloads of stone were placed below the bear-trap gates and one carload under the discharge valves in the river lock wall.

The railroad siding to the lock grounds, heretofore the property of the Pennsylvania Co., was purchased by the United States and placed in a safe condition for heavy traffic. The hull of the old maneuver boat was calked and otherwise repaired and made usable as a dock for the Government inspection launch at Pittsburgh.

Lock and Dam 6.—No repairs to the movable dam were required. New tubes were installed in the maneuver-boat boiler. The air jacks for operating lock valves were regasketed. The blacksmith and carpenter shop were reconstructed on a new foundation and a small brick shelter house for the natural-gas meter built. Expansion in the concrete paving back of the lock wall having moved the stone coping of the lock, a 5-inch strip of the paving 600 feet long was removed and the coping redressed to the face of the land wall. Seven carloads of stone were placed along the river side of the lock wall to receive the discharge from the emptying valves and 6 carloads of stone placed below a portion of the navigable pass to prevent scour. The water pipe to the valve-operating jacks was repaired.

Lock and Dam 7.—No repairs were made to the movable dam. On the lock a new valve-operating sector was placed. Six siphons were installed on the maneuver boat. Grading of the lock grounds was completed, concrete areaways constructed around the windows of lock-keeper houses, and 251 cubic yards of loam deposited on the grounds around lock buildings. A dry-stone wall 50 feet long by 2 feet in height was constructed at bottom of the terrace behind the upper lock-keeper house and another 75 feet long by 2 feet high at the lower side of the driveway at upper gate recess. Seventy-five cubic yards of broken stone were placed on the surface of the driveway at rear of esplanade power house. A water gage on each of the power houses was constructed. The old yard derrick from Lock No. 5 was reerected at lower end of lock. A cellar under the old office building was excavated, 300 cubic yards of material being removed, and a foundation constructed of 21,000 second-grade brick received from Lock No. 6. There being no tenement house in the vicinity of the lock it is the intention to house the families of two of the lockmen in the old office building. No scour occurred at the bear-trap gates or Chanoine Dam.

Lock and Dam 8.—At this structure also no repairs to the dam were required. The piston heads in the valve-operating jacks were turned down and repacked with leather cups. A new 4-way valve for operating lock valves was installed. A broken shaft coupling on the lower gate operating gearing was repaired. A new concrete top 5 inches in thickness by 36 feet long on the land wall of the lock was constructed. A wooden ceiling was erected in the engine room for improvement of the heating conditions during the winter season.

The concrete under the lock-gate engines at both recesses has become badly broken. While eventually it will become necessary to replace the concrete engine foundations, for the present only such repairs have been made as will continue the operation of the lock during the season of 1916.

In December the steamer *W. K. Field*, with 30 barges of coal, stranded at the head of Line Island in pool No. 8.

On December 25 the dam was partially raised at a stage of water slightly under 12 feet. After the vessels had been liberated the dam was lowered on the 26th.

Lock and Dam 9.—This structure was satisfactorily operated during the year, no breakages on the movable dam having occurred. Three hundred and forty tons of large derrick stone were deposited below the bear-trap gates to arrest scour. The esplanade concrete

paving over the pipe lines was restored. New flues were installed in the maneuver-boat boiler. The lock-gate chain drum bearings were reset. Sewers and natural-gas pipe lines were laid at the lock-keeper houses. The Pennsylvania Co. repaired the railroad siding for delivery of materials to esplanade power house.

Lock and Dam 10.—The movable dam was first raised and the structure placed in commission on October 31, 1915. The maneuver boat not being completed, the wickets were raised from the derrick boat with which they had been placed in position. Neither power plant being finished, the lock gates were operated by steam furnished by the Government steamer *T. P. Roberts* and the emptying and filling valves in the gates by hand. On November 13 the movable dam was lowered, and the stage of water did not permit it to be again raised until the end of the year. The operation of the lock and dam was successful in every respect, and no breakages at this structure occurred.

Miscellaneous.—Patrol of banks to prevent improper deposits and encroachments, supervision and inspection of work of sand dredges, inspection of work being done under department permits, and examination and study of drawings submitted with applications for permits were continued.

Sand-dredge operations were carried on in pools 2 to 5, inclusive. Upon inspection of this work it was found that wash piles had been left at a number of points. These piles were removed by the offending parties at the request of this office.

Soundings were taken in the channel immediately below Lock No. 5 after dredging to deepen channel had been completed.

An inspection was made of leaky gas lines crossing the river at Glenfield, Pa., and East Liverpool, Ohio. The owner was notified to repair the leaks in lines.

Upon the request of this office, three gas lines across the back channel at Neville Island were lowered to 14 and 16 feet below pool and two lines were entirely removed.

Four department permits were issued during the year, classified as follows: Pump station and intake, 1; intake pier, 1; and wire crossings, 2.

Five stream-gauging stations were maintained.

AMOUNTS EXPENDED UNDER ALLOTMENTS FROM ACTS OF JULY 5, 1884,
AND MARCH 3, 1909.

Prior to 1903 (see p. 353, H. Doc. No. 421, 57th Cong., 2d sess.)— \$298, 279. 64
Fiscal year ending June 30—

1903.....	43, 267. 74
1904.....	19, 288. 83
1905.....	104, 138. 95
1906.....	66, 906. 37
1907.....	56, 027. 44
1908.....	78, 760. 21
1909.....	119, 954. 97
1910.....	134, 980. 89
1911.....	139, 355. 80
1912.....	168, 241. 66
1913.....	150, 153. 43
1914.....	133, 873. 07
1915.....	186, 579. 73
1916.....	209, 474. 06

Total..... 1, 908, 622. 32

Statement of expenditures for operating and care of locks and dams, Ohio River, Pa., W. Va., and Ohio, during the fiscal year 1916.

Salaries and wages of regular hired labor force.....	\$148,553.97
Miscellaneous supplies and services.....	23,864.46
Miscellaneous repairs.....	32,469.33
Contingencies.....	4,586.33
Total.....	209,474.09

COMMERCIAL STATISTICS.

Classified statement of the traffic on the Ohio River for the calendar year 1915.

[Commerce is estimated by taking the tonnage which passed Lock and Dam No. 1 and the tonnage originating between Locks Nos. 1 and 10, which did not pass Lock and Dam No. 1.]

Items.	Short tons.	Ton-miles.	Value.
Barges, steel.....	2,800	142,800	\$252,000
Boats, steel.....	235	11,965	21,150
Coal.....	2,353,365	98,676,594	4,706,730
Gravel.....	1,181,560	9,965,080	472,636
Iron and steel products.....	23,150	1,527,900	1,157,500
Molasses.....	1,457	96,162	145,700
Lumber.....	5,870	357,552	117,400
Sand.....	1,184,359	10,114,426	473,744
Waste material.....	28,840	144,200	4,326
Miscellaneous.....	32,851	2,168,100	3,286,100
Total.....	4,814,517	123,224,749	10,636,286

Total passengers, 70,796.

Average value per ton, \$2.209.

Average distance transported, 25.6 miles.

The following table gives the number and classes of vessels engaged in freight and passenger traffic during the year:

Steam stern-wheel towboats.....	66
Steam stern-wheel towboats under 50 tons.....	1
Steam stern-wheel sand and gravel dredges.....	7
Sand and gravel dredges without power.....	3
Steam stern-wheel packet boats.....	6
Steam stern-wheel excursion boats.....	2
Steam screw propeller excursion boats.....	1

And a number of small gasoline launches used for towing, ferry, and pleasure purposes.

LOCKS AND DAMS NOS. 11, 13, 18, 26, AND 28, OHIO RIVER.

REPORT OF MAJ. T. H. JACKSON, CORPS OF ENGINEERS.

WHEELING, W. VA., DISTRICT.

The locks and dams were in operation during such periods of the year (except in winter) as the stage of the river required the pools to be maintained for navigation.

Dam No. 11.—In addition to the usual work of operating the lock and dam and of maintaining all structures, plant, etc., the following work was done: Four test wells, each consisting of 1½-inch pipe with a 1½-inch strainer at bottom, were driven in lock esplanade back of land wall for determining the saturation of fill back of wall; the gate recesses were cleaned of mud and débris; the gates and recess covers were scraped and painted; and the steel wheels on downstream side of the lock gates were replaced. All of this work was done by hired labor with Government plant. New gears of worm-screw type for operating the valves in the bear-trap piers were purchased but not installed.

Dam No. 13.—In addition to the usual work of operating the lock and dam and of maintaining all structures, plant, etc., the following work was done: Twenty-five Chanoine wickets in the pass next to the pier were replaced with wickets of the Bebout type; devices were installed on the horse boxes in the pass to prevent the displacement of the quoins under the horse boxes; and repairs were made to the east bear trap. All of the cast-iron counterweights on the lower leaves of both bear traps were removed, resulting in more satisfactory operation of the traps; a needle flat was built, and repairs were made to the maneuver boat; and the hoisting engines and electric-light plants were installed and derricks rigged on the four maneuver boats for Dams Nos. 12, 15, 19, and 20. All of the work was done by hired labor with Government plant. New gears of worm-screw type for operating the valves in the bear-trap piers were purchased but not installed.

Dam No. 18.—In addition to the usual work of operating the lock and dam and of maintaining all structures, plant, etc., the following work was done: Outdoor gaslights were installed on the lock esplanade; all buckle plates on the gate recesses were turned and painted; 539 linear feet of concrete walk, 2 feet wide, were built; 194 cubic yards of stone were placed below the abutment for bank protection; all the quoins and supports for same under the horse boxes on Chanoine weir were replaced with new ones of different design. All of this work was done by hired labor with Government plant. New gears of worm-screw type for operating valves in the bear-trap piers were purchased and installed by hired labor.

Dam No. 26.—In addition to the usual work of operating the lock and dam and of maintaining all structures, plant, etc., the following work was done: One hundred and two panels of iron fence were set around the lock grounds, and 4 test wells, each consisting of 1½-inch pipe with 1½-inch strainer at bottom, were driven in the lock esplanade back of land wall for determining saturation of fill back of wall. All of the work was done by hired labor with Government plant. New gears of worm-screw type for operating valves in the bear-trap piers were purchased but not installed.

Dam No. 28.—The dam was raised for the first time on August 17, 1915. In addition to the usual work of operating the lock and dam and of maintaining all structures, plant, etc., the following work was done: The lock grounds were graded and seeded for lawn. All of this work was done by hired labor with Government plant. New gears of worm-screw type were purchased but not installed.

Lockages for the calendar year ending Dec. 31, 1915.

	Lock No. 11.	Lock No. 12.	Lock No. 13.	Lock No. 20.	Lock No. 23.
Steamboats.....	333	621	603	764	456
Barges and flats.....	981	586	481	1,317	1,066
Rafts and other craft.....	163	461	389	210	179
Total.....	1,527	1,668	1,443	2,791	1,731
Number of lockages.....	570	937	874	855	630

The dams were maneuvered during the fiscal year as follows:

Raised.	Lowered.	S a. m. stages.		Days up.
		Above low water.	Above pass sill.	
		Fect.	Fect.	
Dam No. 11:				
Up at beginning of year.....	July 4, 1915.....	8.9	9.9	4
July 6, 1915.....	July 6, 1915.....	8.7	9.7	0
July 7, 1915.....	July 10, 1915.....	8.6	9.6	3
July 17, 1915.....	Aug. 4, 1915.....	7.9	8.9	18
Aug. 9, 1915.....	Oct. 2, 1915.....	8.4	9.4	54
Oct. 8, 1915.....	Oct. 20, 1915.....	9.2	10.2	12
Oct. 23, 1915.....	Nov. 16, 1915.....	8.5	9.5	24
Nov. 18, 1915.....	Nov. 21, 1915.....	8.8	9.8	3
Nov. 26, 1915.....	Dec. 18, 1915.....	9.0	10.0	23
June 29, 1916.....	Up at end of year.....	7.0	8.0	2
Total.....		9.0	10.0	142
Dam No. 12:				
Up at beginning of year.....	July 4, 1915.....	9.1	12.3	4
July 8, 1915.....	July 10, 1915.....	7.0	10.2	2
July 22, 1915.....	July 29, 1915.....	8.5	11.7	7
Sept. 1, 1915.....	Oct. 2, 1915.....	5.1	8.3	31
Oct. 10, 1915.....	Oct. 20, 1915.....	4.1	7.3	10
Oct. 24, 1915.....	Nov. 16, 1915.....	6.2	9.4	23
Nov. 19, 1915.....	Nov. 21, 1915.....	6.5	9.7	3
Nov. 26, 1915.....	Dec. 17, 1915.....	6.7	9.9	21
Total.....		6.9	10.1	100
Dam No. 13:				
Up at beginning of year.....	July 3, 1915.....	9.3	10.9	3
July 10, 1915.....	July 10, 1915.....	8.4	10.0	0
July 21, 1915.....	Aug. 4, 1915.....	7.9	9.5	14
Aug. 10, 1915.....	Sept. 6, 1915.....	9.5	11.1	27
Sept. 8, 1915.....	Oct. 2, 1915.....	9.7	11.3	24
Oct. 9, 1915.....	Oct. 20, 1915.....	9.1	10.7	11
		8.9	10.5	
		8.5	10.1	
		10.9	12.5	
		8.8	10.4	
		8.4	10.0	

Raised.	Lowered.	8 a. m. stages.		Days up.
		Above low water.	Above pass sill.	
Dam No. 18—Continued.		<i>Feet.</i>	<i>Feet.</i>	
Oct. 28, 1915.....		9.4	11.0	25
		8.7	10.3	
Nov. 26, 1915.....	Nov. 17, 1915.....	9.9	11.5	22
		8.7	10.3	
May 17, 1916.....	Dec. 17, 1915.....	7.0	8.6	1
		6.8	8.4	
May 23, 1916.....	May 18, 1916.....	9.1	10.7	11
		9.7	11.3	
June 30, 1916.....	June 3, 1916.....	10.2	11.6	1
	Up at end of year.....			
Total.....				139
Dam No. 26:				
Up at beginning of year.....				
July 24, 1915.....	July 3, 1915.....	8.7	11.4	3
		7.5	10.2	
Aug. 11, 1915.....	Aug. 4, 1915.....	8.3	11.0	11
		10.5	12.2	
Sept. 10, 1915.....	Sept. 6, 1915.....	12.0	14.7	26
		12.0	14.7	
Oct. 11, 1915.....	Oct. 1, 1915.....	9.7	12.4	21
		9.3	12.0	
Oct. 26, 1915.....	Oct. 21, 1915.....	9.1	11.8	19
		8.3	12.0	
Nov. 20, 1915.....	Nov. 15, 1915.....	8.5	11.2	21
		8.9	11.6	
Dec. 7, 1915.....	Dec. 1, 1915.....	11.0	13.7	2
		6.9	9.6	
	Dec. 17, 1915.....	8.7	11.4	10
Total.....				104
Dam No. 28:				
Aug. 17, 1915.....				
Sept. 13, 1915.....	Sept. 6, 1915.....	7.4	9.2	20
		9.2	11.0	
Oct. 13, 1915.....	Oct. 1, 1915.....	9.8	11.6	18
		7.6	9.4	
Oct. 26, 1915.....	Oct. 20, 1915.....	6.8	8.6	7
		8.5	10.3	
Dec. 8, 1915.....	Nov. 15, 1915.....	9.9	11.7	21
		8.4	10.2	
	Dec. 17, 1915.....	6.8	8.6	9
		8.8	10.6	
Total.....				75

¹ First time raised since completion.*Amount expended under allotments from act of Mar. 3, 1909.***Fiscal year ending June 30—**

1910.....	\$1,032.77
1911.....	12,877.80
1912.....	36,281.11
1913.....	57,877.90
1914.....	57,867.62
1915.....	60,390.50
1916.....	81,891.36

Total..... 308,169.06

Summary of expenditures for operating and care of Locks and Dams Nos. 11, 13, 18, 26, and 28, Ohio River, for the fiscal year ending June 30, 1916.

Office expenses and superintendence.....	\$3,761.21
Labor.....	52,824.82
Fuel.....	2,292.68
Expenses.....	5,166.06
Repairs.....	17,846.59

Total..... 81,891.36

CONTRACTS IN FORCE.

DAM NO. 11.

Contractor: Tri-State Gas Co.

Amount and character of work: \$170; furnishing natural gas for power house.

Rate: Natural gas, at 30 cents per thousand cubic feet.

Date of contract: July 14, 1915.

Date of beginning, July 1, 1915.

Date of expiration: June 30, 1916.

Contract completed.

DAMS NOS. 11, 13, 15, 26, AND 28.

Contractor: Charles Hegewald Co.

Amount and character of work: \$2,190.95; furnishing valve-operating mechanisms.

Rates: Valve-operating mechanism complete for each of the following-named dams, viz: Dam No. 11, \$464.99; Dam No. 13, \$419.99; Dam No. 15, \$375.99; Dam No. 26, \$464.99; Dam No. 28, \$464.99.

Date of contract: August 10, 1915.

Date of beginning: August 20, 1915.

Date of expiration: October 9, 1915. (Time limit waived.)

Completed.

LOCK AND DAM NO. 37, OHIO RIVER.

REPORT OF MAJ. GEORGE R. SPALDING, CORPS OF ENGINEERS.

FIRST CINCINNATI, OHIO, DISTRICT.

Lock and Dam No. 37 was placed under the indefinite appropriation for operating and care on January 1, 1911.

During the fiscal year ending June 30, 1916, the lock force was engaged in removing river deposit from the gate recesses and esplanade, operating the lock and dam, making minor repairs, caring for Government property, repairing roadways, filling and sodding slopes eroded by high water, etc.

Deposit was cleared from the gate recesses twice during the year. In December, 1915, 524 cubic yards of deposit was removed from the gates, and in May, 1916, 2,519 cubic yards of deposit was removed.

The raising and lowering of the dam during the fiscal year is shown in the following table:

Maneuvers of Dam No. 37 during year July 1, 1915, to June 30, 1916.

Raised.	Lowered.	Days up.
Up June 30, 1915.....	July 3	3
July 23.....	Aug. 4	7
Sept. 1.....	Sept. 5	5
Sept. 18.....	Sept. 22	7
Sept. 26.....	Sept. 27	1
Sept. 29.....	Oct. 1	3
Oct. 15.....	Oct. 22	7
Oct. 27.....	Nov. 15	20
Total.....		53

Lockages during fiscal year..... 403

Traffic past dam.

	Through lock.	Through pass.
Steamboats.....	267	1,798
Barges and small craft.....	731	6,177
Total.....	998	7,975

EXPENDED UNDER ALLOTMENTS.

Date allotted:

Oct. 20, 1910	\$2,424.08
July 19, 1911	15,764.96
July 23, Dec. 3 and 6, 1912, and Mar. 10, 1913	31,372.86
July 22, 1913	21,197.86
July 28, 1914, and Mar. 2, 1915	21,743.60
July 15, 1915	18,581.59
Total	111,084.95

Summary of expenditures for operating and care of Lock and Dam No. 37, Ohio River, for the fiscal year ending June 30, 1916.

Salaries of lock force	\$10,610.75
Extra labor	1,848.50
Repairs and incidentals	1,205.23
Fuel	1,169.45
Supplies	1,772.10
Contingencies	1,975.56
Total	18,581.59

CONTRACTS IN FORCE.

Name of contractor: Cincinnati & Suburban Bell Telephone Co.
Amount and character of work: \$100; telephone service.
Price per unit: \$25 per quarter.
Lease dated December 15, 1911.
Date of beginning: October 1, 1911.
Date of expiration: On 30 days' notice by either contracting party.

LOCK AND DAM NO. 41, OHIO RIVER, AND LOUISVILLE AND PORTLAND CANAL.**REPORT OF MAJ. J. O. OAKES, CORPS OF ENGINEERS.****LOUISVILLE, KY., DISTRICT.**

The work is being carried on by hired labor with Government plant.

The subproject and estimate for the fiscal year ending June 30, 1916, approved July 14, 1915, provides as follows:

It is proposed to operate the canal and locks and to make such repairs as may from time to time become necessary to maintain them in good navigable condition; to operate the dredging outfit as needed in cleaning the canal and locks of deposit brought into them by high water; to make such repairs to the towboats, dredges, buildings, walls, slopes, gates, pavements, roadways, fences,

and other Government property as may be necessary to maintain them in good serviceable condition; and care for and operate the dam.

The estimate for the year is summarized as follows:

Regular force.....	\$76, 720
Repairs and replacements.....	73, 750
Miscellaneous supplies and contingencies.....	19, 500
Total.....	169, 970

Under the foregoing subproject and estimate the operations during the fiscal year, in addition to the usual work of passing traffic, operating the movable dams, and ordinary current repairs incident to care and operation, were as follows:

The canal was open to navigation 301 days 14 hours and 30 minutes during the year, and was closed 64 days 9 hours and 30 minutes during the year on account of high water. The highest stage of water occurred April 3, when the upper gage read 27.2 and the lower gage 52.8 feet. The lowest stage on the upper gage was 8.2 feet on October 2, and on the lower gage 5.7 feet November 11.

The dredging plant, consisting of the towboat *Cherokee* and dredges *Louisville* and *Casey* and auxiliary craft, was employed during the year in keeping the canal locks and approaches free from deposit, in dredging the west approach to the new lock, and in assisting in miscellaneous repair work. The dredge *Casey* was loaned to Dam No. 43, Ohio River, from March 9 to 31. The towboat *Cherokee* and maneuver boats *Nos. 1* and *2*, assisted in operating the dams and in handling materials for current repairs and in loading and transporting material for construction, supplies, etc., for Dam No. 43. The shops were operated in connection with current repairs to locks, dams, machinery, floating plant, etc., in the construction of wickets for Dam No. 29, construction of cabin and installation of machinery on dredge *Nolin River*, fitting up drill boats for Dam No. 22, etc.

Details of work performed for improvements not contemplated under the subproject for operating the canal may be found in the reports for those works.

Details of operations under the subproject, other than for the operation of the locks and the care of the property, are as follows:

DREDGING PLANT.

Dredging (towboat "Cherokee," dredges "Louisville" and "Casey," and maneuver boats "Nos. 1" and "2.")

Location.	Scow loads.	Material.		Gross cost per cubic yard.
		Mud and sand.	Rock.	
		Cu. yds.	Cu. yds.	
Channel, Louisville & Portland Canal.....	949	127, 725	.....	.....
Lower lock chamber.....	73	12, 200	.....	.....
Channel below locks.....	109	15, 000	.....	.....
Lower entrance to new lock.....	447	58, 800	3, 360	\$0. 125
Dry dock cofferdam.....	13	2, 150	.....	.....
Dam No. 43.....	49	5, 090	150	.....
Total.....	1, 640	220, 965	3, 510	.....

Expended.

Regular force and extra labor..... \$47, 774. 77

MANEUVERING THE DAM.

The dam was maneuvered as follows:

Section No.	Length operated.	Raised.	Lowered.	Section No.	Length operated.	Raised.	Lowered.
	<i>Feet.</i>	1915.	1915.		<i>Feet.</i>	1915.	1916.
10 Chanoine.....	120		July 2	5 Boulé.....	140	Oct. 30	
Do.....	450		July 3	8 Boulé.....	116	Nov. 1	
2 Boulé.....	100		July 8	Do.....	36	Nov. 2	
3 Boulé.....	100		Do.	Do.....	152		Nov. 15
2 Boulé.....	208		July 9	10 Chanoine.....	640		Nov. 15
Do.....	224	July 10		7 Boulé.....	196		Nov. 17
Do.....	84	July 15		5 Boulé.....	200		Nov. 15
3 Boulé.....	100	July 16		Do.....	168	Nov. 21	
Do.....	100		July 21	Do.....	32	Nov. 27	
Do.....	108	July 24		10 Chanoine.....	30	Dec. 2	
10 Chanoine.....	200	July 26		Do.....	100	Dec. 3	
Do.....	340	July 28		Do.....	252	Dec. 10	Dec. 4
Do.....	120	July 29		Do.....	58	Dec. 13	
Do.....	180		Aug. 3	Do.....	130		Dec. 15
Do.....	120		Aug. 4	Do.....	100		Dec. 16
Do.....	120		Aug. 6	Do.....	508		Dec. 17
Do.....	120		Aug. 7	2 Boulé.....	100		Do.
Do.....	96		Aug. 9	2 Boulé.....	200	Dec. 28	
2 Boulé.....	100		Do.	Do.....	200		Dec. 28
3 Boulé.....	100		Do.			1916.	
2 Boulé.....	100	Aug. 10		Do.....	200	Feb. 23	
3 Boulé.....	100	do.		Do.....	200		Feb. 25
5 Boulé.....	100	Aug. 18	Aug. 18	5 Boulé.....	328		Feb. 27
10 Chanoine.....	140	do.	Do.	2 Boulé.....	192	Mar. 22	
5 Boulé.....	104		Aug. 21	Do.....	192		Mar. 25
Do.....	104	Aug. 24		Do.....	248	Apr. 12	
10 Chanoine.....	200	Aug. 26		10 Chanoine.....	20	May 16	
Do.....	376	Sept. 2		Do.....	112	May 17	
Do.....	32	Sept. 3		2 Boulé.....	104	do.	
2 Boulé.....	300		Sept. 6	Do.....	56	May 18	
3 Boulé.....	100		Do.	3 Boulé.....	100	do.	
5 Boulé.....	328		Do.	10 Chanoine.....	188	do.	
2 Boulé.....	300	Sept. 13		Do.....	268	May 19	
3 Boulé.....	100	Sept. 14		5 Boulé.....	140	May 23	
5 Boulé.....	200	Sept. 15		Do.....	100		May 25
8 Boulé.....	116	Sept. 18		Do.....	40		May 26
5 Boulé.....	100		Sept. 20	10 Chanoine.....	140		Do.
10 Chanoine.....	240		Sept. 23	Do.....	140	May 27	
Do.....	100	Sept. 25		Do.....	140		May 29
Do.....	200		Sept. 27	Do.....	332		May 30
Do.....	100	Sept. 28		Do.....	100	June 1	
Do.....	100		Oct. 1	Do.....	156		June 3
8 Boulé.....	116		Do.	Do.....	100		June 7
5 Boulé.....	140		Oct. 2	2 Boulé.....	200		June 8
10 Chanoine.....	272		Do.	3 Boulé.....	100		Do.
2 Boulé.....	408		Oct. 4	2 Boulé.....	200	June 13	
3 Boulé.....	100		Do.	3 Boulé.....	100	do.	
2 Boulé.....	408	Oct. 7		10 Chanoine.....	140	June 16	
3 Boulé.....	100	Oct. 8		Do.....	140		June 19
5 Boulé.....	240	Oct. 11		2 Boulé.....	200		June 20
10 Chanoine.....	200	Oct. 13		3 Boulé.....	100		Do.
Do.....	444	Oct. 16		2 Boulé.....	200	June 27	
5 Boulé.....	140		Oct. 20	3 Boulé.....	100	do.	
10 Chanoine.....	300		Oct. 23	10 Chanoine.....	72	June 30	
Do.....	300	Oct. 29					

Total linear feet raised.....	9,116
Total linear feet lowered.....	9,835
Expended.....	\$1,674.00

REPAIRS AND REPLACEMENTS.

Ordinary current repairs.—This item included a great variety of minor repairs made by the shop force, operating force, and boat crews, augmented by extra labor when required, necessary to keep the lock walls, lock gates, lock engine houses, towboats, dredges, scows, barges, derrick boats, maneuver boats, cottage, offices, slopes, warehouses, shops, shop machinery, electric-light plant, dry dock, bridges, roadways, fences, and other property in repair. The more

important items of work accomplished under this head are as follows: Made new smokestacks for carpenter shop and for lock engine houses, new dipper, dipper handles, spuds, shafting, and backing drum for dredges, and brass castings for general repairs to boats, shops, and locks; repaired roller and corner bands, straightened channels, and made steel hatch covers for two scows; calked two scows and two barges; painted the towboat *Cherokee*, rebuilt the wheel and furnace, installed new boilers, repaired the nosing and fantail, and built new ice box; calked the dredge *Casey* and repaired the rake plank, roof, and corner bands; repaired the hull and machinery of launch *Tarascon*; removed the old arc-light dynamos and engine from the north lock engine house and replaced them with two Wiley direct-connected dynamos taken from maneuver boat; replaced electric-transmission wires about the canal with new wire; repaired, calked, and painted skiffs and small flats, etc.

Expended.

Labor	\$7,757.94
Material	3,995.73
Total	11,753.67

Two steel dump scows.—The two 150-cubic yard steel dump scows contracted for in the preceding fiscal year were completed and delivered by the contractor, the American Bridge Co., on October 12.

Expended.

Contract cost	\$16,500.00
---------------	-------------

Replacing cribbing, etc., in dry dock.—The work of replacing the old cribbing and water logs with concrete cribbing and water logs, commenced during the last fiscal year, was completed in August of the present year. The work was done by hired labor.

Cost.

Labor:	
Removing cribbing, bilge blocks, etc.	\$631.02
Building forms	668.06
Placing concrete	306.86
Cleaning, etc.	209.68
Miscellaneous	7.66
	\$1,823.28
Materials:	
Lumber	32.50
Sand, gravel, and cement	169.77
Steel angles	208.41
	410.68
Total	2,233.96

Of this amount \$1,361.60 was expended during the fiscal year 1916.

Completing coal bin.—The construction of a new concrete bin, with capacity sufficient to hold 1½ barges of coal, was begun during the last fiscal year, and completed January 16, 1916. It required 594.9 cubic yards of concrete. The work was done by hired labor.

Cost.

Labor:	
Excavation	\$426.32
Pile driving	261.32
Building forms	5,079.94

Labor—Continued.

Removing forms.....	\$202.60	
Plain concrete.....	545.30	
Reinforced concrete.....	8,231.06	
Coal chutes.....	291.79	
Retaining wall.....	73.84	
Work on concrete plant.....	452.81	
Inspection.....	581.72	
Watchmen.....	236.07	
Miscellaneous.....	775.37	
		\$12,158.74

Materials:

Lumber.....	1,008.79	
Piles (160).....	198.40	
Cement.....	905.55	
Sand and gravel.....	273.57	
Bolts, nails, wire, etc.....	119.80	
Deformed reinforcing bars.....	1,301.10	
Structural steel.....	195.55	
Track material.....	253.87	
Miscellaneous.....	7.91	
		4,354.54

Total 16,513.28

Of this amount, \$9,905.45 was expended during the fiscal year 1916.

Replacing dry-dock gates.—A contract, approved December 4, 1915, was entered into with the American Bridge Co., for furnishing and erecting new steel gates to replace the old wooden ones. At the close of the fiscal year the miter sills only had been delivered.

Work preparatory to the installation of the gates is being done by hired labor. A cofferdam has been constructed, the old wooden gates removed, the masonry on the north side raised 2 feet and the gate recess 7 feet, and the forms for raising the south side masonry partially in place.

Expended.

	Miter sill.	Raising wall.	Dry-dock gates.	Total.
Labor:				
Handling materials.....	\$54.32	\$62.03	\$13.72	\$130.07
Building cofferdam.....	1,761.18			1,761.18
Repairs to drill, etc.....	23.59			23.59
Concrete forms.....		347.49		347.49
Concrete.....		111.03		111.03
Chipping.....		53.38		53.38
Inspection, etc.....		120.49		120.49
Removing old gates.....			64.09	64.09
Drilling for anchors.....			98.36	98.36
Total.....	1,839.09	695.02	177.17	2,711.28
Materials:				
Cement.....	287.50	337.50		625.00
Lumber, iron, wire, etc.....	1,192.20	305.47		1,497.67
Sand and gravel.....		132.00		132.00
Total.....	1,479.70	774.97		2,254.67
Total expended.....	3,318.79	1,469.99	177.17	4,965.95

New hull, boilers, and derrick for dredge "Casey."—Proposals, to be opened July 29, 1916, have been invited for furnishing the new steel hull and derrick.

Repairs to dam.—Work under this head consisted in repairing 29 Boulé trestles, damaged and bent by drift and ice; replacing 28

damaged Boulé trestles and 2 upstream boxes with good ones; repairing truss chains, hooks, and wickets; making new hooks and chains, and removing loose rock from foundation.

Expended..... \$1,459.74

Miscellaneous supplies and contingencies.—Expenditures under this heading were for fuel, oil, and miscellaneous supplies used on towboats, dredges, maneuver boats, locks, shops, etc., amounting to \$14,766.79.

DRY DOCK.

The dry dock was used by four Government boats during the year, occupying it 45 days 12 hours. It was occupied by one private boat 8 days 6 hours, for which a rental of \$87.50 was collected.

WORK DONE FOR OTHER DISTRICTS.

First Cincinnati district.—During the year 178 pass wickets and 34 weir wickets for Dam No. 29 were completed.

Cost.

Labor:		
Unloading materials.....	\$908.36	
Work on wickets.....	4,594.71	
Handling rejected timbers.....	57.01	
Compensation to injured employees.....	21.25	
		\$5,581.33
Material:		
Lumber.....	5,637.74	
Iron plates, rods, etc.....	343.07	
Carbolentum.....	209.95	
Coke.....	10.67	
Miscellaneous.....	4.14	
		6,205.57
Total		11,786.90

Of this amount \$11,383.20 was expended during the fiscal year.

Wheeling, W. Va., district.—Drill boats *Nos. 10 and 11* were repaired, the machinery overhauled, and quarter boat *No. 3* cleaned and repaired.

Expended.

Labor	\$397.00
Materials	118.04
Towing	273.75
Miscellaneous	28.10
Total	816.89

The description of operations, etc., in this report is taken from the report of Asst. Engineer Frank I. Louckes, who had local supervision throughout the year.

Summary of expenditures on account of operating and care of Louisville & Portland Canal, fiscal year 1916, showing general items and amount expended under each heading.

Services	\$77,226.96
Supplies	7,690.72
Materials	31,081.12
Miscellaneous	3,128.68
Total	119,077.48

COLLECTIONS.

1915.	
July 2. Henry Bickel Co., rent of dredging plant.....	206.25
Aug. 6. Henry Bickel Co., rent of dredge.....	30.00
Aug. 13. The Monongahela Consolidated Coal & Coke Co., rent of dredging plant.....	16.88
Sept. 27. Kentucky & Indiana Terminal R. R. Co., rent of land.....	20.00
Oct. 1. J. B. Speed & Co., rent of land.....	125.00
Oct. 2. Kentucky & Indiana Terminal R. R. Co., rent of land.....	250.00
Nov. 11. Henry Bickel Co., rent of dredging plant and derrick boat....	176.25
Nov. 15. O'Donnell & Co., rent of land.....	50.00
Dec. 13. F. F. Snead, use of dry dock.....	87.50
1916.	
Jan. 28. Kentucky & Indiana Terminal R. R. Co., rent of land.....	10.00
Mar. 31. J. B. Speed & Co., rent of land.....	125.00
June 22. Ohio River Contract Co., rent of pontoons.....	97.50
Total	1,194.38

All of the above collections were covered into the Treasury of the United States as "Miscellaneous receipts."

Net expenditures for operating and care of Louisville & Portland Canal, by fiscal years.

From funds derived from rents, tolls, etc.:

1874.....	\$2,490.78
1875.....	45,887.15
1876.....	59,266.48
1877.....	66,138.47
1878.....	62,203.70
1879.....	73,720.91
1880.....	77,106.53
1881.....	¹ 22,640.18
1882.....	¹ 7,615.18

\$417,069.38

From appropriation of \$42,000, act of Mar. 3, 1881:

1881.....	35,750.10
1882.....	4,812.81

40,562.91

From allotments under the act of Mar. 3, 1881:

1882.....	54,105.66
1883.....	61,333.14
1884.....	53,189.18
1885.....	4,872.02

173,500.00

From allotments from the permanent indefinite appropriation:

1885.....	67,496.56
1886.....	64,262.75
1887.....	76,969.00
1888.....	52,876.97
1889.....	66,292.06
1890.....	58,136.21
1891.....	64,497.18
1892.....	73,979.26
1893.....	69,348.74
1894.....	118,377.68
1895.....	111,859.66
1896.....	118,766.09
1897.....	87,901.56

¹Appropriated by the act of June 14, 1880.

From allotments from the permanent indefinite appropriation—Continued.

1898	\$87,569.12
1899	68,083.78
1900	92,273.51
1901	75,330.09
1902	106,539.04
1903	85,937.53
1904	86,119.11
1905	91,762.52
1906	88,048.14
1907	128,328.13
1908	108,114.15
1909	90,196.94
1910	75,094.88
1911	80,116.09
1912	119,649.21
1913	109,759.84
1914	117,898.15
1915	119,402.87
1916	119,077.48
	<hr/> \$2,874,564.35
Total	<hr/> 2,505,696.64

CONTRACTS IN FORCE.

Name of contractor: American Bridge Co.

Amount and character of work: \$8,043.70; furnishing and erecting one mitring dry-dock gate of two leaves.

Prices per unit: Structural steel, 5 cents per pound; cast steel, 10 cents per pound; cast iron, 8 cents per pound; babbitt, 60 cents per pound; yellow pine, \$130 per M feet b. m.

Date of approval: December 4, 1915.

Date of beginning work: January 8, 1916.

Date of expiration: June 6, 1916; 30 days additional allowed for removal of rubbish.

Percentage of completion at the end of the fiscal year: None.

COMMERCIAL STATISTICS.

Statement of traffic through the Louisville & Portland Canal and through the open-river channel over the falls of the Ohio River at Louisville, Ky., during the calendar year 1915.

Kind of craft.	Via canal.		Via open-river channel.		Total.	
	Number.	Net registered tonnage.	Number.	Net registered tonnage.	Number.	Net registered tonnage.
Passenger boats	512	116,624	81	16,185	593	132,809
Towboats	992	90,006	139	15,077	1,132	105,083
Coal barges	1,636	518,069	175	57,526	1,811	575,595
Other barges	993	175,536	24	8,648	1,017	184,184
Small craft	595	94	20	14	615	108
Total	4,729	900,329	439	97,450	5,168	997,779

Statement of commerce through the Louisville & Portland Canal and through the open-river channel over the falls of the Ohio River at Louisville, Ky., during the calendar year 1915.

Articles.	Via canal.		Via open-river channel.		Total.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
Coal.....	703,500	\$1,407,000	76,960	\$153,920	780,460	\$1,560,920
Corn.....	687	18,549	71	1,917	758	20,466
Wheat.....	1,944	85,536	15	560	1,959	86,196
Salt.....	12,287	122,870	57	570	12,344	123,440
Oil.....	613	15,325	116	2,900	729	18,225
Whisky.....	1,251	500,400	155	62,000	1,406	562,400
Flour.....	3	150	.....	.....	3	150
Sugar.....	257	30,840	85	10,300	342	41,040
Molasses.....	796	79,600	1	100	797	79,700
Cement.....	3,147	22,029	34	238	3,181	22,267
Tobacco.....	1,484	356,160	40	9,600	1,524	365,760
Brick.....	954	3,053	.....	.....	954	3,053
Cotton.....	299	71,760	.....	.....	299	71,760
Hay.....	6,859	171,475	83	2,075	6,942	173,550
Straw.....	2,577	64,425	191	4,775	2,768	69,200
Cattle.....	745	80,400	135	16,300	880	106,600
Swine and sheep.....	1,218	164,430	93	12,555	1,311	176,985
Horses and mules.....	156	56,160	23	8,280	179	64,440
Lumber.....	30,476	609,520	806	16,120	31,282	625,640
Staves.....	29	696	.....	.....	29	696
Shingles.....	2	50	.....	.....	2	50
Manufactured iron.....	15,259	764,750	2,657	132,850	17,916	897,600
Produce.....	425	34,000	.....	.....	425	34,000
Miscellaneous.....	141,680	14,168,000	3,047	304,700	144,727	14,472,700
Total.....	926,648	18,836,178	84,509	739,660	1,011,217	19,575,838

Number of passengers:

Via canal.....	18,239
Via open-river channel.....	1,217
Total.....	19,456

CONSOLIDATED STATEMENT OF EXPENDITURES FOR OPERATING AND CARE OF LOCKS AND DAMS ON OHIO RIVER.

Pittsburgh district (Locks and Dams Nos. 1 to 10).....	\$1,903,622.82
Wheeling district (Locks and Dams Nos. 11, 13, 18, 26, and 28).....	308,169.06
First Cincinnati district (Lock and Dam No. 37).....	111,084.95
Louisville district (Lock and Dam No. 41, and Louisville & Portland Canal).....	3,505,696.64
Total.....	5,828,573.47

APPROPRIATIONS.

OHIO VALLEY FLOOD BOARD.

July 25, 1912 (allotted May 21, 1913).....	\$500.00
Expended to June 30, 1916.....	500.00

¹ This amount was expended by the Pittsburgh Engineer office, the district officer then in charge of the district being disbursing officer for the flood board.

OFFICE OF CHIEF OF ENGINEERS.

July 25, 1912 (allotted Sept. 6, 1912)	\$2,500.00
July 25, 1912 (allotted July 23, 1913)	2,312.70
July 25, 1912 (allotted Aug. 18, 1914)	2,182.85
Total	6,995.55
Apr. 21, 1915, withdrawn for allotment to Louisville Engineer district	1,788.00
Net total allotted	5,207.55
Expended to June 30, 1916	5,207.55

CONSOLIDATED STATEMENT OF APPROPRIATIONS FOR ENTIRE RIVER.

Pittsburgh district	\$11,042,056.16
Wheeling district	17,904,719.85
First Cincinnati district	7,534,600.00
Louisville district	12,824,495.62
Office Chief of Engineers	5,207.55
Ohio Valley flood board	500.00
Not yet allotted to any district	223,000.00
	\$49,534,579.18
Receipts from other sources:	
Pittsburgh district	20,878.42
Wheeling district	9,320.59
First Cincinnati district	1,680.88
Louisville district	4,430.60
	36,309.99
Total receipts from all sources	49,570,889.17
Expended on the work to June 30, 1916:	
Pittsburgh district	\$10,955,206.89
Wheeling district	14,039,683.87
First Cincinnati district	4,842,203.90
Louisville district	9,760,893.04
Office Chief of Engineers	5,207.55
Ohio Valley flood board	500.00
	39,603,695.25
Balance unexpended July 1, 1916:	
Pittsburgh district	107,727.69
Wheeling district	1,446,856.57
First Cincinnati district	1,581,576.48
Louisville district	1,822,033.18
	4,958,193.92
Unallotted July 1, 1916	9,000.00
Appropriated since July 1, 1916	5,000,000.00
Total	49,570,889.17

¹ In addition to this amount, dividends on stock of Louisville & Portland Canal to the amount of \$257,778 (not disburseable) were received.

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IMPROVEMENT OF RIVERS AND HARBORS IN THE PITTSBURGH, PA., DISTRICT.

REPORT OF LIEUT. COL. FRANCIS R. SHUNK, CORPS OF ENGINEERS.

IMPROVEMENTS.

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1. Monongahela River, Pa. and W. Va.....	2831	5. Operating and care of locks and dams, Allegheny River, Pa..	2848
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FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1215 TO 1235.

1. MONONGAHELA RIVER, PA. AND W. VA.

REBUILDING LOCK AND DAM 6.

At the beginning of the year about 30 per cent of the concrete had been placed, 75 per cent of the earth and 33 per cent of the rock excavation had been completed. This included the building of the middle and river walls from the head of the walls to the upper gates, the upper sills and a 60-foot section of the guard wall, within the cofferdam inclosure.

Weather and river conditions remained favorable until October 1. Rock and earth excavation and the placing of concrete proceeded simultaneously, the concrete being placed in the middle and river walls as the rock excavation progressed. Excellent rock foundation was found throughout the entire length of the walls. The walls were tied to the rock by 1½-inch bars, 3 feet long, spaced about 4 feet apart. High water interfered with the work from October 1 to 5 and from November 15 to 19. The excavation for the lock walls and the chamber was completed on November 26. During the year 5,650 cubic yards of rock and 2,432 cubic yards of earth were excavated. The river and middle walls, sills, and tunnel containing 18,194 cubic yards of concrete, were completed October 30. A section of the dam, about 21 feet long, was built between the river wall and the river arm of the cofferdam. On November 27, upon the completion of the excavation in the lock chamber, the entire construction plant was removed from within the cofferdam. Pumping was suspended and on account of failure by the contractors to deliver gates, valves, operating machinery, and water turbine plant at the time specified, the pumping plant was removed and the coffer allowed to fill.

During November the dredge was employed on the excavation for the upper guard wall. Upon the completion of the excavation, the 50-foot section of crib was floated into position and sunk on November 28. The crib was filled with stone and capped with a concrete top. The reinforced concrete powerhouse, located on the middle wall, was completed November 30.

The air compressors and turbine were received on January 8 but could not be installed on account of high water and other delays until February 24. The installation of the water turbine plant was completed in March. Between January and June a small force was employed in laying pipe lines, placing a guard strip along the lock walls, care of fleet and cofferdam. The contractor started work on the erection of the lock gates May 17 and completed the work on June 12. Work was started immediately placing the heel and toe posts and the bumping planks on the gates, the lower gates being practically completed. On May 8 two 8-foot cylindrical valves were received and immediately installed. The two butterfly valves and the valve and gate operating machinery have not been received. The cause of the delay in delivery of lock gate, valves and machinery is due to the molders' and machinists' strike, inability to get material, the scarcity of labor and the placing of one contracting firm in the hands of a receiver. This delay has increased the cost of the work considerably and delayed the opening of the lock at least 6 months. Ninety-five per cent of the work has been completed. There remains to be done, the completion of the upper guard wall, installation of butterfly valves and operating machinery, completion of the timber work on the lock gates and the removal of the cofferdam.

APPROPRIATIONS.

Monongahela River, W. Va.:

Previous project (see H. Doc. 1491, 63d Cong., 3d sess., p. 499)-----	\$482,900.00	
Received from other sources, Sept. 25, 1889 (allotted from examinations, surveys, and contingencies of rivers and harbors)-----	4,000.00	\$486,900.00
Present project—		
July 13, 1892, improving Monongahela River, W. Va.-----	25,000.00	
Aug. 18, 1894, improving Monongahela River, W. Va. and Pa.-----	20,000.00	
June 3, 1896, improving upper Monongahela River, W. Va.-----	180,000.00	
June 4, 1897, improving upper Monongahela River, W. Va.-----	350,000.00	
July 1, 1898, improving upper Monongahela River, W. Va.-----	400,000.00	
June 28, 1902, improving Monongahela River, W. Va.-----	350,000.00	
Apr. 28, 1904, improving Monongahela River, W. Va.-----	100,000.00	
		1,275,000.00
Total of appropriations-----		1,711,900.00
Less amount carried to surplus fund of Treasury-----		59,691.70
Net total-----		1,652,208.30

¹ Of this allotment \$1,892.85 was carried to the surplus fund.

Monongahela River, W. Va.—Continued.

Received from other sources:

On bond of failing contractor-----	¹ \$107,463.86	
Sale of condemned property-----	21.64	
		\$107,485.50
Grand total-----		<u>1,759,693.80</u>

Monongahela River, Pa.:

Previous project (see H. Doc. 1491, 63d Cong., 3d sess.,
p. 499)----- 3,771,916.82

Present project—

Mar. 3, 1899, improving Locks Nos. 3 and 6 and for floating plant-----	\$50,000.00	
June 6, 1900, completing improvements at Locks Nos. 3 and 6 and for floating plant. ²	135,556.00	
June 13, 1902, rebuilding Lock and Dam No. 2-----	200,000.00	
Mar. 3, 1903, rebuilding Lock and Dam No. 2-----	455,961.00	
Mar. 3, 1905, certain improvements at Locks and Dams Nos. 5 and 6-----	³ 7,850.00	
Mar. 3, 1905, rebuilding Lock and Dam No. 3-----	200,000.00	
June 30, 1906, rebuilding Lock and Dam No. 3-----	389,196.00	
Mar. 2, 1907, rebuilding Lock and Dam No. 5-----	256,042.00	
May 27, 1908, rebuilding Lock and Dam No. 5-----	300,000.00	
Mar. 4, 1909, rebuilding Lock and Dam No. 5-----	200,000.00	
June 25, 1910, completing reconstruction of Lock and Dam No. 2-----	43,000.00	
Mar. 4, 1913, rebuilding Lock and Dam No. 6-----	178,200.00	
Mar. 4, 1915, rebuilding Lock and Dam No. 6-----	211,200.00	
July 27, 1916, rebuilding Lock and Dam No. 6-----	29,460.00	
		2,856,465.00
Total of appropriations-----		6,428,381.82
Less amount returned to surplus fund of Treasury-----		5,959.65
Net total-----		6,422,422.17
Received from other sources:		
Sales of condemned property-----	\$1,127.45	
Sales of blue prints-----	6.82	
Sale of land-----	10,000.00	
		11,134.27
Grand total-----		<u>6,433,556.44</u>

Consolidated statement:

For Monongahela River, W. Va-----	1,759,693.80
For Monongahela River, Pa-----	6,433,556.44
Grand total-----	<u>8,193,250.24</u>

¹ Of this amount \$58,299.35 was carried to the surplus fund.² Of this allotment \$130.46 was carried to the surplus fund.³ Of this allotment \$2,986.25 was carried to the surplus fund.

CONTRACTS IN FORCE.

STEEL LOCK GATES, VALVES, AND LOCK-OPERATING MACHINERY, LOCK NO. 6.

Contractor: Thomas Carlin's Sons Co.

Amount and character of work: \$7,600, furnishing and delivering valves and lock-operating machinery required under section A at Lock No. 6, Monongahela River.

Date of approval: September 24, 1915.

Date of beginning work: October 18, 1915.

Date of expiration: December 28, 1915.

Ninety-five per cent completed.

Contractor: Union Foundry & Machine Co.

Amount and character of work: \$13,556.81, furnishing and erecting two pairs of steel lock gates and furnishing and delivering the rest of the metal work mentioned in section B at Lock No. 6, Monongahela River.

Date of approval: September 23, 1915.

Date of beginning work: October 15, 1915.

Date of expiration: Complete the delivery of the parts noted under sections A and B, paragraph 20, within three months after said date of receipt of notification and to complete the erection and assembling of the lock gates, as specified, within 40 working days thereafter, or after subsequent notification that the masonry is ready to receive the gates.

Completed.

AIR COMPRESSORS, GAS ENGINE, TURBINE, ELECTRIC-LIGHT PLANT, ETC., LOCK NO. 6.

Contractor: Hall Steam Pump Co.

Amount and character of work: \$4,444, furnishing and installing two air compressors and one water turbine mentioned in lot 1 at Lock No. 6, Monongahela River.

Date of approval: September 22, 1915.

Date of beginning work: October 5, 1915.

Date of expiration: Work of installation must be commenced immediately after the date of receipt of notification from the contracting officer that the power house is ready to receive the machinery, which it is expected will be about November 15, 1915, and all the work must be completed within 30 days after date of receipt of said notification.

Ninety-five per cent completed.

Contractor: Hope Engineering & Supply Co.

Amount and character of work: \$3,100, furnishing and installing one gas engine and one electric-light and starting plant complete, with three air tanks including their respective appurtenances, mentioned in lot 2, at Lock No. 6, Monongahela River.

Date of approval: October 6, 1915.

Date of beginning work: October 21, 1915.

Date of expiration: Work of installation must be commenced immediately after the date of receipt of notification from the contracting officer that the power house is ready to receive the machinery, which it is expected will be about November 15, 1915, and all the work must be completed within 30 days after date of receipt of said notification.

Completed.

COMMERCIAL STATISTICS.

The total commerce of the river is estimated by taking all the downstream tonnage at Lock No. 3 except iron and steel products, the downstream tonnage of iron and steel products at Lock No. 1, all the upstream tonnage at Lock No. 1, the coal mined and shipped in pools 1 and 2, and the tonnage which originates above and does not pass through Lock No. 3. This is manifestly a conservative estimate. The traffic for the calendar year 1915 is classified as follows:

Articles.	Short tons.	Ton-miles.	Value.
Brick.....	15	45	843
Coal.....	10,018,588	439,715,827	29,687,176
General merchandise.....	1,875	63,760	140,686
Gravel.....	773,368	7,828,354	329,347
Iron and steel products.....	190,390	1,992,115	8,019,500
Live stock, horses.....	130	7,540	46,809
Lumber.....	2,360	54,060	47,069
Machinery.....	150	5,560	15,000
Mine braces.....	320	10,880	800
Pit posts.....	3,525	168,675	9,165
Railroad ties.....	1,060	86,100	5,250
Sand.....	761,275	9,579,749	304,510
Stone.....	541	10,820	541
Timber.....	1,531	85,213	30,626
Waste material.....	89,977	719,816	13,497
Total.....	11,815,086	460,026,484	28,979,379

Total passengers, 27,799.

Average value per ton, \$2.45.

Average distance transported, 38.9 miles.

Comparative statement of total commerce of the river.

	Products.	Passen- gers.		Products.	Passen- gers.
Fiscal year:	Tons.¹	Number.	Calendar year—Continued;	Tons.¹	Number.
1902.....	9,100,887	181,427	1909.....	11,485,278	47,265
1903.....	11,369,814	101,457	1910.....	10,927,480	47,089
1904.....	9,268,736	116,174	1911.....	10,747,041	38,371
1905.....	9,211,752	78,468	1912.....	11,676,329	38,729
1906.....	11,447,444	77,134	1913.....	12,039,173	43,596
1907.....	11,817,136	46,216	1914.....	10,878,969	37,662
Calendar year:			1915.....	11,815,086	27,799
1907.....	12,772,508	42,373			
1908.....	9,667,229	26,164			

¹ 2,000 pounds.

The following table gives the number and classes of vessels engaged in freight and passenger traffic during the year:

Steam stern-wheel towboats.....	50
Steam stern-wheel towboats under 50 tons.....	2
Steam screw-propeller towboats.....	4
Steam stern-wheel sand and gravel dredges.....	8
Oil-burning stern-wheel packet boat.....	1
Steam stern-wheel excursion boats.....	2
Steam screw-propeller excursion boat.....	1

And a number of small gasoline launches used for towing, ferry, and pleasure purposes.

A packet line, operating one boat between Pittsburgh and Greensboro, Pa., was established.

2. OPERATING AND CARE OF LOCKS AND DAMS, MONONGAHELA RIVER, PA. AND W. VA.

REBUILDING LOCK AND DAM NO. 4, MONONGAHELA RIVER.

At the beginning of the fiscal year the work on the new river lock was practically completed, there remaining to be done only the placing of the bumping plank on the lock gates, the removal of the cofferdam, and the completion of the upper guard wall. This work was accomplished on July 31 and the lock placed in commission. Upon

the completion of the new outer lock work was started on the construction of the cofferdam for the new inner lock. The upper arm was completed early in September. The framing of the lower coffer was not started until September 30, in order to allow the removal of the lock gates and old middle wall to an elevation of lower pool level, to be accomplished by the dredge and derrick boat. A rise in the river on October 1 interrupted work on the lower coffer, the skeleton of which was half completed, causing a loss of five days and necessitating the removal of the frame and redredging. The coffer was completed October 16. During the removal of the old middle wall work was in progress on the building of the construction plant which, in addition to the floating plant of derrick, pump boat, etc., consisted of two traveling derricks along the old land and lower guide walls, a concrete-mixing plant with a connection by trestle to the railroad siding and cement shed. A pump house, on pile foundation, was built at the inner lower corner of the cofferdam.

The cofferdam was unwatered on October 20 and work continued on the removal of the old middle wall and the concrete and timber floor of the old chamber. A great deal of these materials were used in building the upper guide crib and other work. A line of 3-inch oak protection sheeting was driven along the base of the old land wall and steel sheet piles along the upper and lower guide walls within the cofferdam inclosure and along the lower arm of the coffer. A row of 9 by 12 inch by 15 foot sheet piling was driven along the upper guard sill to the old land wall and along the face of the new land wall from the head of the land wall to a distance of 50 feet from the lower end. On January 11, on account of weather and river conditions, active operations were suspended for the winter. During April and May the crib foundation for the upper guide wall was completed. The cofferdam was unwatered on May 6 and work resumed on the construction of the land wall. At the close of the fiscal year 5,880 cubic yards of concrete had been placed, excavation for the land wall and sills practically completed, about 75 per cent of the pile driving completed, and the foundation crib for the upper guide wall completed. The work remaining to be done is the completion of the inner chamber, upper and lower guide walls, and installation of gate and lock operating machinery.

Lock and Dam 1, Pittsburgh, Pa.—The trap doors over the machinery pits were repaired. The lock force painted the warehouse, shelter houses, interior of both power houses, smokestack, lock gates, pipe lines, and all operating machinery.

New bumping planks were placed on the lock gates. The planks were protected by covering of $\frac{1}{8}$ -inch sheet-iron plates. The valves in the gates were inspected and repaired by the diver. Three broken tension bars on the lock gates were removed and new bars installed. Steel doors were installed in the water turbine power house. The upper and lower approaches to the lock were dredged to 1 foot below sill depth. New air cylinders to operate the gate valves were installed in the middle wall. Both of the butterfly emptying valves located in the lower end of the river wall were removed and repaired. The shafts were found broken immediately above the blade, the section at this point having been reduced from $8\frac{1}{4}$ inches to 2 inches. The shaft below the blade was also reduced a similar amount. The

blade on all edges was reduced from three-fourths inch to practically a feather edge.

Lock and Dam 2, Braddock, Pa. (11.2 miles above mouth of river).—New bumping planks were placed on the lock gates, land chamber, and all broken planks on the gates in the river chamber were replaced. The broken tension bars on the lower gates, land chamber, were removed and replaced by new bars. New covers were placed over all the lock-operating machinery pits. A 2-inch gas line was laid from Thirteenth Street, Braddock, to the land power house. A new gas engine and generator were installed in the land power house. New hot-water heaters were installed in the lock residences.

The cofferdam inclosing the new water turbine power house was removed and the plant placed in operation in August. The coupling on the vertical shaft of the water turbine broke, necessitating the placing of the steam auxiliary plant in commission until a new coupling could be secured. The crib below the dam adjoining the river wall was repaired. This consisted in rebuilding the four upper courses for a length of 75 feet.

All the cover plates, machinery on walls, power house, and all pipe lines were painted. A new duplex lead-incased cable was laid from the land power house to the middle wall, thence along the wall to the light poles. The lower approach to the lock was dredged.

On account of the effect of acid in the water, numerous repairs were made to pipe lines, valves, etc.

Lock and Dam 3, Elizabeth, Pa. (23.8 miles above mouth of river).—The warehouse, shelter houses, and all tin work on the lock residences and power house were painted. The extra gates for the upper end of the river chamber were scraped and painted. New tension bars and bumping plank were placed on all the lock gates. The cylindrical valves in the river wall and the upper end of middle wall were repaired. The acid water attacks the rivets connecting the structural-steel parts of the spider to the cast-steel parts. An examination was made of the cylindrical filling valve located in the upper end of the land wall. This valve was in such condition that it could not be repaired at once, as it was necessary to order many new parts. The valve seat was found badly eaten away, making it impossible to obtain a tight seal, and the rivets were loose, many having pulled through. The valve is now out of commission and will be repaired as soon as the new parts arrive.

Repairs were made to the lower gates, land chamber. A small crack was found in the upper horizontal I-beam of the right leaf. Small holes were drilled at both ends of the crack and the beam reinforced by riveting plates above and below the crack. The opposite leaf was also repaired. To accomplish repairs on this gate it was necessary to remove the gate. The vertical I-beam at the heel of the gate was broken, making it necessary to install a new beam. The lower horizontal beam was cracked and was repaired by reinforcing with plates above and below the crack. Three cast-iron electric-light poles were installed on the middle wall. Other repairs were of a minor nature.

Lock and Dam 4, North Charleroi, Pa. (41.2 miles above mouth of river).—The new outer lock was placed in commission July 31, 1915, and the old inner chamber closed on August 4, 1915, in order to per-

mit the construction of the cofferdam for the new inner chamber. The lock residence and office were painted. The two butterfly emptying valves located in the lower end of the river wall refused to work, and upon examination it was found that the valves were cracked horizontally at about the center of the blade, the crack extending from the center to a point about 12 inches from each side of the blade showing that it was caused by a strain left in the casting when it was cast. After an unsuccessful attempt to weld the crack new valves were ordered and installed May 20. No trouble has been experienced with the new valves.

Lock and Dam 5, South Brownsville, Pa. (56.7 miles above mouth of river).—Reinforced concrete and steel cover plates were placed over all the machinery pits and valve openings. The tin work on the lock residences, warehouse, and office was painted. The machinery is in excellent condition and repairs were exceedingly few and of a minor nature.

Lock and Dam 6, Rices Landing, Pa. (68.7 miles above mouth of river).—To facilitate lockages a double-drum engine was installed on the upper end of the old river wall. By this means a great deal of time is saved by pulling craft into and out of the lock. The emptying valves in the lower gate and the bumping planks were repaired.

Lock and Dam 7 (82.7 miles above mouth of river).—An addition was built to the lower lock residence. Repairs were of a minor nature. New bumping planks were placed on the lock gates.

Lock and Dam 8 (87.5 miles above mouth of river).—Four new 15-inch water turbines were installed to operate the valves and gates. The lock and valve operating machinery were thoroughly overhauled. New cover plates were placed over all machinery pits. The upper gates were repaired.

Lock and Dam 9 (93.2 miles above mouth of river).—An addition for bathroom was built to the lock residence. The lower gates were repaired.

Lock and Dam 10 (102.6 miles above mouth of river).—No repairs were necessary.

Lock and Dam 11 (105 miles above mouth of river).—The filling valves were repaired. A test was made to determine the effect on the dam of drilling holes and forcing grout into the voids. This experiment showed very unsatisfactory results and on May 12 work was started on building a new concrete dam of the same section immediately above and adjoining the old dam. Materials were immediately contracted for and as soon as the lumber was received work was started on the plant and necessary buildings. A cement shed, tool house, oil house, and mess quarters were completed. A railroad siding was built to the cement shed and a chute from the shed to the boat landing. Clusters of mooring piles were driven above the dam on both sides of the river. On June 7 the dredge arrived and was employed in dredging along the left bank at the landing and in dredging for the new dam. On June 14 dredging was discontinued on account of the breaking of the backing drum. The work was also delayed by the nonarrival of the hardwood timber for the bracing frames for the cofferdam. Steel sheet piles to be used for the cofferdam were unloaded and stored along the bank.

Lock and Dam 12 (109.8 miles above mouth of river).—Only minor repairs were necessary.

Lock and Dam 13 (111.3 miles above mouth of river).—No repairs were necessary.

Lock and Dam 14 (116.5 miles above mouth of river).—A rise in January damaged the riprap on the right bank immediately below the dam. It required 35 cubic yards of riprap stone to repair the damage. Repairs were made to one of the valves in the lower gate.

Lock and Dam 15 (124 miles above mouth of river).—No repairs were necessary.

Boat yard and shops near Lock 4.—The platform and foundation timbers for the concrete mixing machinery on flat No. 13 were removed and new timbers put in place. The cement shed was rebuilt and the flat was thoroughly overhauled. The following craft were docked and thoroughly repaired: Five flats, 3 derrick boats, 1 pile-driver flat, 1 quarter boat, 4 dump scows, and 1 pump boat. Six new flats and three derrick boats were built. The steamer *Kittanning*, with the exception of the boilers and steel hull, was built at the boat yard. In the saw and planing mill timbers for the repairs to gates at Locks Nos. 8, 9, 11, and 12 were worked out; heel and toe posts and fenders for the gates at new Locks Nos. 4 and 6 and the sill timbers for the same locks were worked out; 278 wickets were built for the Ohio and Allegheny River dams and 200 pike poles sawed and worked out for the various locks and craft. A new pipe line was laid from the river to the boiler house; the track in the lumber yard was relaid and the runway at the rear of the sawmill rebuilt.

During the rainy weather the building of a second floor in the lumber shed was completed and material prepared for additions to the lock houses at Locks Nos. 7 and 9. Sixty-two cars of lumber and supplies were unloaded and stored. In the forge and machine shops, 2 clam-shell buckets were practically rebuilt; 30 spuds and 8 fenders were built for the dredges and derrick boats; 2 dipper handles were built for the dredge boats; 1 dipper bucket was rebuilt; 1 centrifugal pump was practically rebuilt, and the engines in the shop and sawmill were thoroughly repaired. A large number of bolts were forged and threaded and numerous repairs of a minor nature made to the floating plant.

Dredge and repair boats.—The snag boat *Swan* has been engaged in general towing, tending dredge, inspection service, removing snags and obstructions, and repairs to lock gates at Lock No. 3. On November 17 the boat was placed in the docks and extensive repairs made to the hull. The repairs were completed April 20. Four large snags in the fourth pool and a large tree in the channel at the head of Line Island, Ohio River, were removed. A sunken flat was removed at Lock No. 5, and a number of small snags in pools 1 and 4. During the year U. S. dredge No. 2 was employed in dredging the approach to new Lock No. 4, removing the old cofferdam and filling and banking the new coffer for the inner lock at No. 4, dredging lower approach to Lock No. 2 and upper approach to Lock No. 1, dredging foundation for new crib at Locks Nos. 2, 4, and 6, and dredging foundation for the new dam at Lock No. 11.

Dredge *No. 1* was engaged on the Ohio River throughout the year, dredging in the vicinity of Lock No. 10.

The repair boat *Slackwater* was employed on repairs to bumping plank and lock gates at Lock No. 3; repairs to valves at Locks Nos. 1, 3, and 4; in the installation of new water turbines, repairs to machinery and lock gates at Lock No. 4; and on the installation of heel and toe posts on new lock gates at Lock No. 6. During high water the crew was employed on repairs to flats, building wickets, etc., at the boat yard. The boat was also employed on tending dredge and miscellaneous towing.

The steamer *T. P. Roberts* was undergoing repairs until July 18. The repairs included practically the rebuilding of the hull and wheel. The boat was employed on the Ohio River tending dredge *No. 1*, on miscellaneous towing, and furnishing steam to unwater the cofferdams at Locks Nos. 2 and 3, Ohio River.

The crane boat *Monongahela* was employed on repairs to the lock gates, installation of new gate operating machinery, sinking of protection crib below the lock along the abutment, and installation of Betwa wickets at Lock No. 1; building the extension of lower guide wall at Lock No. 2, and upper guide wall at Lock No. 4; building addition to lock houses at Locks Nos. 7 and 9; and repairs to lock gates at No. 9. During high water the crew was employed on repairs to flats and unloading timber at the boat yard.

Miscellaneous.—Patrol of banks to prevent improper deposits and encroachments, supervision and inspection of work of sand dredges, and inspection of work being done under department permits and examination, and study of drawings submitted with applications for permits were continued.

Soundings for a distance of 3,400 feet were made in the vicinity of Millsboro, Pa., and at mouth of sewer at Monessen, Pa. Examinations and soundings where dredging or scraping had been done with permission of the district officer were made at the following places: Camden tipple in pool 2; Walton, Coal Bluff, Catsburg, and Black Diamond tipples in pool 3; Tremont, Alicia, Chamouni, and Crescent tipples in pool 4; and W. Harry Brown landing in pool 6.

Thirteen permits were issued by the department during the year, classified as follows: Marine ways, 1; wire crossings, 1; ice breakers and dredging, 3; coal hoist, 1; pipe line, 1; tipple and ice breakers, 1; sand and gravel excavation, 1; bank fills, 2; temporary unloading pier, 1; and 1 for a highway bridge to be built by the city of Fairmont, W. Va.

Photographs of Locks and Dams 2, 4, and 6 were taken. Two new triangulation stations, to replace those covered by slag filling, were established and other stations checked in the vicinity of Clairton, Pa. Final examinations were made of the following new bridges constructed under department permits: Railway bridges of the Pennsylvania Railroad Co., the Monongahela Railway Co., and the Buckhannon & Northern Railroad Co., at West Brownsville Junction, Pa., New Geneva, Pa., and Catawba, W. Va., respectively, and of the highway bridge of Washington and Fayette Counties at Brownsville, Pa.

A public hearing in connection with a proposed highway bridge at Fairmont, W. Va., was held at Fairmont, February 24.

AMOUNTS EXPENDED UNDER ALLOTMENTS FROM ACTS OF JULY 5, 1884,
AND MAR. 3, 1909.

Previous allotments (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 499) -----	\$929,454.58
Fiscal year ending June 30—	
1903 -----	238,710.05
1904 -----	292,149.13
1905 -----	234,070.41
1906 -----	249,625.71
1907 -----	242,865.62
1908 -----	257,349.99
1909 -----	241,174.91
1910 -----	364,663.38
1911 -----	376,302.72
1912 -----	301,480.91
1913 -----	317,464.49
1914 -----	358,661.83
1915 -----	527,445.28
1916 -----	432,400.87
Total -----	5,363,319.38

*Statement of expenditures for operating and care of locks and dams,
Monongahela River, Pa. and W. Va., during the fiscal year 1916.*

Expended for Locks and Dams Nos. 1 to 15, inclusive:	
Salaries and wages of regular hired labor force -----	\$204,244.80
Miscellaneous supplies and services -----	23,280.14
Miscellaneous repairs -----	45,131.49
Contingencies -----	4,152.17
Reconstruction of Dam No. 11 -----	5,981.42
Total -----	282,790.02
Expended for rebuilding Lock and Dam No. 1 -----	7,802.56
Expended for rebuilding Lock and Dam No. 4 -----	141,807.79
Total -----	432,400.37

CONTRACTS IN FORCE

Contractor: Hall Steam Pump Co.

Character and amount of work: Air compressors, water turbine, etc.

Price: \$4,160.

Date of contract: November 20, 1914.

Date of approval: December 10, 1914.

Date fixed for commencement: December 25, 1914.

Date fixed for completion: 90 days after completion of power house.

Progress of work: 95 per cent completed.

Contractor: Foos Gas Engine Co.

Character and amount of work: One gas engine, and one electric light and
starting plant, etc.

Price: \$3,225.

Date of contract: November 20, 1914.

Date of approval: December 11, 1914.

Date fixed for commencement: January 1, 1915.

Date fixed for completion: 90 days after completion of power house.

Progress of work: 90 per cent completed.

INSPECTION AND SURVEY BOAT "KITANNING."

Contractor: Chas. Hegewald Co.

Character and amount of work: One steel hull for inspection and survey boat *Kittanning* for Pittsburgh engineer district.

Price: \$8,989.

Date of contract: January 19, 1915.

Date of approval: February 1, 1915.

Date fixed for commencement: February 16, 1915.

Date fixed for completion: July 6, 1915.

Progress of work: 99 per cent completed.

REBUILDING LOCK NO. 4.

Contractor: Penn Bridge Co.

Amount and character of work: \$9,256, furnishing and delivering all valves and lock-operating machinery required under section A of specifications, at Lock No. 4, Monongahela River.

Date of approval: May 26, 1916.

Date of beginning work: June 22, 1916.

Date of expiration: December 2, 1916.

Five per cent completed.

Contractor: Independent Bridge Co.

Amount and character of work: \$20,550, furnishing and erecting 2 pairs of steel lock gates, and furnish and deliver the rest of the metal work mentioned in section B of specifications, at Lock No. 4, Monongahela River.

Date of approval: May 24, 1916.

Date of beginning of work: June 16, 1916.

Date of expiration: Complete delivery within 6 months after May 27, 1916, and complete erection within 40 working days thereafter, or after subsequent notification that the masonry is ready to receive the gates.

Five per cent completed.

COMMERCIAL STATISTICS.

Lockages made and traffic passed at Monongahela River locks during the calendar year ending Dec. 31, 1915.

At dam—	Lockages.		Steamboats.		Coal boats, barges, flats, and boat bottoms.		Rafts.	
	Up.	Down.	Up.	Down.	Up.	Down.	Up.	Down.
	Number.	Number.	Number.	Number.	Number.	Number.	Number.	Number.
1.....	4,687	4,649	4,296	4,268	13,918	13,764	3	1
2.....	4,704	4,864	4,143	4,187	16,126	15,938	1	.....
3.....	5,153	5,235	4,470	4,444	20,262	20,058	.....	1
4.....	6,272	6,226	3,687	3,606	16,816	16,734	.....	2
5.....	2,034	2,006	1,780	1,777	5,668	5,569	.....	7
6.....	2,058	2,146	517	519	2,178	2,132	2	6
7.....	376	401	128	128	163	176	.....	5
8.....	398	408	162	163	199	185	2	4
9.....	438	458	162	163	197	215	.....	3
10.....	215	223	70	69	136	144	2	5
11.....	161	168	54	54	126	138	2	4
12.....	151	158	43	43	107	114	2	1
13.....	101	106	37	37	100	106	.....	.....
14.....	268	262	38	38	107	113	.....	.....
15.....	228	228	18	18	47	46	2	.....
Aggregate.....	27,122	27,433	19,564	19,449	75,154	74,475	16	40

Lookages made and traffic passed at Monongahela River locks during the calendar year ending Dec. 31, 1915—Continued.

At dam—	Other craft.		Coal.		Ralls, steel.	
	Up.	Down.	Up.	Down.	Up.	Down.
	Number.	Number.	Tons.	Tons.	Tons.	Tons.
1.....	320	354	3,640	3,561,880	.....	.....
2.....	275	273	10,560	6,775,000	100	.....
3.....	218	167	2,130	9,916,040	.....	.....
4.....	302	870	1,658	8,119,600	.....	.....
5.....	132	114	780	2,779,620	104	.....
6.....	468	445	9,784	789,202	155	.....
7.....	237	254	372	35,348	2	.....
8.....	235	235	380	30,900	.....	.....
9.....	261	268	244	35,336	.....	.....
10.....	147	152	44	35,280	.....	.....
11.....	96	101	.....	35,280	.....	.....
12.....	102	110	.....	35,280	.....	.....
13.....	60	66	.....	35,280	.....	.....
14.....	219	224	.....	35,280	.....	.....
15.....	231	232	2	.....	.....	.....
Aggregate.....	3,373	3,367	29,574	32,169,326	361	.....

At dam—	Other iron or steel products.		Sand.		Gravel.	
	Up.	Down.	Up.	Down.	Up.	Down.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1.....	136,889	19,912	678,032	38,985	769,380	25,392
2.....	440	7,510	371,868	54,924	499,417	19,801
3.....	626	3,639	51,198	60,345	93,219	1,893
4.....	488	2,459	33,879	1,893	63,791	3,699
5.....	72	286	28,994	.....	56,718	.....
6.....	639	301	25,752	8,819	43,469	13,263
7.....	35	47	83	.....	5,332	.....
8.....	37	57	5,037	106	5,009	.....
9.....	.....	.....	3,231	.....	10,020	.....
10.....	1	10	582	261	2,693	7
11.....	100	10	582	276	2,693	35
12.....	2	2	346	258	2,623	.....
13.....	.....	.....	519	258	2,658	.....
14.....	.....	.....	519	258	2,658	.....
15.....	3	1	536	258	2,658	.....
Aggregate.....	139,262	34,234	1,201,163	176,663	1,562,388	64,280

At dam—	Stone.		Brick.		Timber.	
	Up.	Down.	Up.	Down.	Up.	Down.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1.....	188	1,434	15	15	1,432	855
2.....	.....	471	.....	.....	1,487	128
3.....	.....	353	.....	.....	444	99
4.....	1,006	779	300	.....	358	4,530
5.....	.....	47	300	.....	278	1,219
6.....	677	589	498	.....	1,296	1,329
7.....	.....	.....	.....	.....	.....	965
8.....	.....	.....	.....	.....	578	1,179
9.....	.....	.....	.....	.....	.....	1,190
10.....	.....	.....	.....	.....	182	862
11.....	.....	.....	.....	.....	182	876
12.....	.....	.....	.....	.....	4	56
13.....	.....	.....	.....	.....	.....	.....
14.....	.....	.....	.....	.....	.....	.....
15.....	.....	.....	.....	8	.....	.....
Aggregate.....	1,871	3,664	1,113	23	6,241	13,288

Lockages made and traffic passed at Monongahela River locks during the calendar year ending Dec. 31, 1915—Continued.

At dam—	Lumber.		Lath and shingles.		Pit posts.	
	Up.	Down.	Up.	Down.	Up.	Down.
1.....	Tons. 1,367	Tons. 1,248	Tons.	Tons. 1	Tons. 3,535	Tons.
2.....	1,818	1,686	.....	17	5,450	.....
3.....	1,354	983	.....	.....	5,475	.....
4.....	828	232	.....	.....	5,200	.....
5.....	448	254	.....	.....	2,775	4,550
6.....	768	490	.....	.....	.....	7,900
7.....	55	60	.....	.....	.....	8,000
8.....	67	41	.....	.....	.....	8,200
9.....	1	39	.....	.....	.....	8,400
10.....	.....	30	.....	.....	.....	8,600
11.....	.....	.....	.....	.....	.....	4,000
12.....	.....	.....	.....	.....	.....	1,500
13.....	.....	.....	.....	.....	.....	600
14.....	.....	11	.....	.....	.....	600
15.....	44	6	.....	1	.....	.....
Aggregate.....	6,760	5,000	.....	19	22,425	53,300

At dam—	Mine braces.		Ties, railroad.		Wood.	
	Up.	Down.	Up.	Down.	Up.	Down.
1.....	Tons. 320	Tons.	Tons. 1,060	.....	Tons.	Tons.
2.....	120	.....	1,860	.....	.....	.....
3.....	120	.....	1,450	.....	.....	.....
4.....	.....	.....	1,500	.....	.....	.....
5.....	.....	.....	800	.....	.....	.....
6.....	.....	.....	1,515	.....	.....	.....
7.....	.....	.....	.....	150	.....	.....
8.....	.....	.....	.....	200	.....	.....
9.....	.....	.....	40	.....	.....	.....
10.....	.....	.....	.....	.....	.....	.....
11.....	.....	.....	.....	.....	.....	.....
12.....	.....	.....	.....	.....	.....	.....
13.....	.....	.....	.....	.....	.....	.....
14.....	.....	.....	.....	.....	.....	.....
15.....	.....	.....	.....	.....	8	.....
Aggregate.....	560	.....	3,205	350	8	.....

At dam—	General merchandise.		Farm, dairy, and orchard products.		Live stock large.	
	Up.	Down.	Up.	Down.	Up.	Down.
1.....	Tons. 977	Tons. 6,040	Tons.	Tons.	Tons. 65	Tons. 6
2.....	16,257	3,478	.....	.....	110	6
3.....	13,834	878	8	.....	103	5
4.....	2,008	2,860	10	.....	103	5
5.....	437	847	.....	.....	43	2
6.....	4,975	1,123	8	.....	29	13
7.....	175	68	.....	.....	16	4
8.....	76	71	.....	.....	1	1
9.....	38	158	2	77	.....	.....
10.....	32	25	.....	.....	.....	.....
11.....	12	27	.....	.....	.....	.....
12.....	12	2	.....	.....	.....	.....
13.....	2	2	.....	.....	.....	.....
14.....	21	16	.....	.....	.....	.....
15.....	22	20	.....	1	.....	.....
Aggregate.....	38,878	15,120	28	78	478	37

Lockages made and traffic passed at Monongahela River locks during the calendar year ending Dec. 31, 1915—Continued.

At dam—	Live stock, small.		Total tonnage.		Passengers.	
	Up.	Down.	Up.	Down.	Up.	Down.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Number.</i>	<i>Number.</i>
1.....			1,596,820	3,655,802	8,268	8,432
2.....	1		899,503	6,863,096	13,945	13,954
3.....			169,954	9,993,265	7,136	5,864
4.....			111,144	8,135,757	1,709	1,625
5.....			91,729	2,787,102	3,539	3,274
6.....			86,565	773,054	601	576
7.....			6,120	45,244	520	470
8.....			11,187	40,944	255	246
9.....			13,574	45,174	876	1,025
10.....			3,534	45,075	261	300
11.....			3,569	40,504	254	287
12.....			2,987	37,146	110	137
13.....			3,179	36,138	150	189
14.....			3,198	36,163	272	282
15.....			3,263	293	349	351
Aggregate.....	1		3,009,326	32,534,757	38,145	37,172

3. ALLEGHENY RIVER, PA.—OPEN-CHANNEL WORK.

The improvements hitherto accomplished by way of low dams and dikes and the removal from the channel of obstructive boulders, snags, gravel bars, etc., have tended to maintain during the year between the New York State line and pool No. 3 a satisfactory channel for rafting, logging, and navigating with light-draft boats. Incessant rains and moderate rises throughout the year prevented examination of the deteriorated structures in need of repairs. However, such investigation as could be made in the spring of 1916 indicates that the damaged structures have not suffered materially during the past year and that in large measure they still perform their functions. It is probable that investigation will lead to the conclusion that present and future prospects of navigation above Hickory, Pa., do not justify further important regulation operations to that section of the stream. Dams and dikes on the lower part of the river, however, will require such overhauling as will maintain their usefulness until the recently approved lock and dam project has been completed.

Miscellaneous.—The patrol of banks to prevent improper deposits and encroachments between Natrona, the upper end of slack water, and Salamanca, N. Y., supervision and inspection of work of sand dredges, inspection of work being done under department permits, and examination and study of drawings submitted with applications for permits were continued. A public hearing was held at Warren, Pa., April 5, 1916, in connection with a proposed highway bridge at that place.

Eight permits were issued by the department during the year, classified as follows: Bank fills, 3; sidings, retaining walls, etc., 3; and bridges, 2—one to the Pennsylvania Railroad Co. for a railway bridge at Oil City, Pa., and the other to the county commissioners of Warren County, Pa., for a reinforced concrete highway bridge at Warren. Final examination was made of the new highway bridge of

Armstrong County at Ford City, Pa. Photographs of bridges between Natrona and Mahoning Creek were taken for use at public hearing in the matter of the raising of low bridges on Allegheny River at Pittsburgh. Tracing of the maps of the limit line survey at Oil City, Pa., was continued.

APPROPRIATIONS.

Mar. 3, 1879.....	\$10,000.00	June 13, 1902.....	\$10,000.00
June 14, 1880.....	20,000.00	June 13, 1902 (allotment,	
Mar. 3, 1881.....	25,000.00	June 24, 1904).....	¹ 5,000.00
Aug. 2, 1882.....	15,000.00	Mar. 3, 1909 (allotment,	
July 5, 1884.....	35,000.00	Mar. 17, 1909).....	1,000.00
Aug. 5, 1886.....	30,000.00	June 25, 1910.....	5,000.00
Aug. 11, 1888.....	25,000.00	Mar. 4, 1913.....	2,000.00
Sept. 19, 1890.....	20,000.00	July 27, 1916.....	15,000.00
July 13, 1892.....	25,000.00		
Aug. 18, 1894.....	12,500.00		288,000.00
June 3, 1896.....	12,500.00	Amount carried to surplus	
Mar. 3, 1899.....	15,000.00	fund.....	1,375.48
June 6, 1900 (allotment,			
Aug. 17, 1900).....	5,000.00	Total.....	286,624.52

COMMERCIAL STATISTICS.

[Calendar year 1915.]

Again the usual custom of gathering commercial statistics of the Allegheny River by communication with the individual shippers and receivers of freight by water has been followed, that being the only means available for securing even an approximate estimate of the water transportation of the valley. Generally reports of river trade are solicited only from those who conduct a regular navigation business, and little is known about the commerce of the much larger number of small intermittent shippers. In view of these conditions it is probable that the commerce of the river as reported is less than the actual amount.

The following table shows the traffic on the open river above slackwater:

	Short tons.	Ton-miles.	Value.
Barges and boat bottoms.....	1,512	125,668	\$49,140
Barges, decked.....	300	45,900	12,000
Flats.....	256	39,168	10,240
Gravel.....	85,622	85,622	34,249
Lumber.....	374	51,672	7,480
Pit posts.....	125	5,750	7,325
Sand.....	63,982	63,982	25,545
Sand, glass grinding.....	106,819	106,819	85,455
Waste material.....	20,000	20,000	3,000
Total.....	278,870	544,461	227,434

Average value per ton, \$0.81.

Average distance transported 1.95 miles.

During the year the following craft were operated:

Steam stern-wheel towboats.....	7
Steam stern-wheel sand and gravel dredge.....	1
Sand and gravel dredges without power.....	9

4. ALLEGHENY RIVER, PA.—CONSTRUCTION OF LOCKS AND DAMS.

No work was performed under this project during the year. It is the intention before completing Lock and Dam No. 4 to apply the funds remaining on hand for "Construction of dam at Herr Island,"

¹ Of this allotment \$1,375.48 was carried to surplus fund.

etc., as applied to the reconstruction of the dam and abutment and the restoration of the bank at Springdale, to the raising of the crest of Dam No. 3 $1\frac{1}{2}$ feet to its original elevation. Delay in this matter is desirable as favoring a more satisfactory decision concerning the best method of accomplishing the increase in height, in view of the unusually rapid wearing away of the decking of the existing crib dam. In the meantime 20-inch flash boards are being used during the annual low-water season to maintain the pool at its intended height. On the construction of Locks and Dams Nos. 4 to 8, inclusive, nothing was done pending a favorable decision relative to the raising of the obstructive bridges over the Allegheny River at Pittsburgh, as provided in the river and harbor act of March 4, 1913. The requisite assurance to the Secretary of War of the intention to remove the existing obstructions has not been given.

APPROPRIATIONS.

Aug. 5, 1886-----	\$37,500.00	June 30, 1906-----	\$281,228.63
Aug. 11, 1888-----	35,000.00	Mar. 2, 1907-----	235,000.00
Sept. 19, 1890-----	35,000.00	Aug. 31, 1908, amount	
July 13, 1892-----	40,000.00	transferred from oper-	
Aug. 18, 1894-----	40,000.00	ating and care of Ohio	
June 3, 1896-----	50,000.00	River-----	5,000.00
June 4, 1897-----	350,000.00	June 25, 1910-----	48,233.00
July 1, 1898-----	800,000.00	July 25, 1912-----	300,000.00
Mar. 3, 1901-----	128,000.00		
June 28, 1902-----	118,500.00	Total-----	2,011,459.63
Mar. 3, 1905 (allotment			
of July 12, 1905)-----	10,000.00		
Received from other sources:			
Sales of condemned property-----		\$1,185.65	
Sales of blue prints-----		19.05	
			1,204.70
Total-----			2,012,664.33

COMMERCIAL STATISTICS.

The following table shows the traffic on slack-watered portion of the river from Natrona to the mouth:

	Short tons.	Ton-miles.	Value.
Barges, etc.-----	2,680	58,853	\$91,120
Billets, steel-----	129,333	181,066	2,909,992
Coal-----	758,304	1,353,573	1,516,608
Gravel-----	518,361	3,250,123	207,344
Iron and steel products-----	50	1,100	2,500
Kegs, empty-----	1,200	1,680	72,000
Lumber-----	1,858	29,454	37,160
Merchandise, general-----	240	3,600	18,000
Pit posts-----	5,060	121,200	13,130
Railroad ties-----	400	1,000	2,000
Sand-----	414,237	2,692,540	165,695
Stone-----	96	336	96
Timber-----	1,024	8,663	20,480
Waste material-----	66,821	66,821	10,023
Total-----	1,899,654	7,770,009	5,066,148

Total passengers, 6 808.

Average value per ton, \$2.67.

Average distance transported, 4.09 miles.

The number and classes of vessels engaged in commerce during the year are shown in the following table:

Steam stern-wheel towboats.....	14
Steam stern-wheel towboats under 50 tons.....	1
Steam screw-propeller towboat.....	1
Steam stern-wheel sand dredges.....	7
Sand dredges without power.....	5

For total tonnage and other details see "Allegheny River, Pa., open-channel improvement and construction of locks and dams."

5. OPERATING AND CARE OF LOCKS AND DAMS, ALLEGHENY RIVER, PA.

The maintenance and operation of the locks and dams during the year were conducted without unusual difficulties, except as to the filling and emptying valves at Lock No. 2. The breakages as affecting commercial movements were unimportant and readily repaired by the operating forces, and the structures were kept in condition for promptly serving the interests of navigation at all seasons save when the pools were closed with ice. On one occasion an ice gorge near the head of pool No. 2 raised the water above, entirely obliterating the 74-foot lift at Dam No. 3. No particular significance attaches to this occurrence, no damage to the structures therefrom having occurred. Again the year passed without producing an extraordinary flood out of the Allegheny.

Lock and Dam No. 1.—The frequency of moderate rises increased the number of maneuvers of the movable structure and materially reduced the aggregate number of days on which the movable dam was in raised position. By lowering a greater number of wickets in the navigable pass as occasion required the practicability of passing larger rises than heretofore was satisfactorily demonstrated. No scour below the dam resulted from the practice. Owing to the large deposits of sediment within the lower leaf of the smaller beartrap gate, adjoining the abutment, the gate was kept out of commission during the entire year. The Chanoine wickets in this dam were made 17 years ago and are of the frame and panel type. Consequently their deterioration has reached the point where extra precautions are necessary to avoid pulling off of handle plates during maneuvers. One injured wicket was removed and repaired, a horse repaired, and two wickets, horses and props, and quoins under six horses placed. On several wickets new panels were placed. Two lock valves were repaired and two additional snubbing posts, one on each lock wall, were installed. The original pinion and sector gearing for operating beartrap valve was removed, pier recesses enlarged, and worm-gear devices for valve maneuvers installed.

Natural gas pipe lines were laid on lock and grounds and light posts set for illuminating purposes. The upper lock gates were re-sheathed. New flues were installed in maneuver boat boiler. A contract for electric-lighting plants for the Ohio River maneuver boats included also a similar outfit for the maneuver boat at this structure.

A sudden rise in August, 1915, necessitated the lowering of a few wickets adjoining the lock. The scour created thereby slightly undermined the lower guard crib, permitting a portion of the filling and

paving stone to fall out. Subsequently the crib was refilled and paved and the surplus stone placed along the river edge of the crib to prevent further undermining.

The maneuvers of the movable dam during the year are shown in the following table:

Raised.	Lowered.	Days up.
Up at beginning of year.....	July 10.....	10
July 17.....	Aug. 5.....	19
Aug. 9.....	Oct. 20.....	72
Oct. 23.....	Dec. 18.....	56
May 14.....	May 18.....	4
May 22.....	June 4.....	13
June 29.....	Up at end of year..	2
Total.....		176

Lock and Dam No. 2.—In the lock the four emptying and filling valves have gradually become worse, notwithstanding repeated repairs. As a result a contract was let to the Independent Bridge Co., of Pittsburgh, for four new valves, which at the end of the year were completed, ready for delivery and installation. Otherwise no breakages or deterioration of consequence occurred. A moderate freshet destroyed the footbridge between the river lock wall and upper guard crib and removed about 10 cubic yards of material from the esplanade slope. The necessary repairs were made by the lock operating force.

The lower guide wall was recessed 18 inches wide by 12 inches deep for a height of 19 feet and a steel ladder constructed therein. Also 6 heavy mooring hooks were placed in the face of the wall in 18-inch circular recesses 8 inches in depth. A handy flat 10 by 28 feet by 30 inches in depth for general use at this structure was constructed at the Government sawmill at Lock No. 4, Monongahela River.

Lock and Dam No. 3.—This structure was maintained throughout the year in its usual satisfactory condition. The only damage of consequence was the demolition of the lower guard crib, 12 feet wide by 47 feet long, by an ice gorge on March 10. The remains of the crib were removed, the timbers being recovered and the stone filling placed on the outside of the submerged lock-wall protection crib. Since all guard cribs at lower extremities of river lock walls in this district have been eliminated, it is improbable that this one will be reconstructed. The head of the upper guard crib and the abrasions on chamber faces of lock walls were repaired and new bumping planks placed on lock gates. Also the sheathing on lower lock gates was partly replaced. A handy flat 10 by 28 feet by 30 inches in depth was constructed for general purposes here at the Government sawmill at Lock No. 4, Monongahela River.

While refilling the wash back of the abutment at Springdale, a wooden box culvert was placed in the embankment to dispose of surface water from the vicinity of the Pennsylvania Railroad. This box, having decayed and caved in at various places, was replaced during the year by a 24-inch diameter vitrified sewer 240 feet in length. The sewer was constructed at a depth of 5½ feet at upper

and 10½ feet at lower end by hired labor supervised by the lock master. The slope deck timbers of the crib dam, although considerably worn, are still in fair condition and promise, with slight repairs, to serve during at least another year.

Miscellaneous.—The patrol of banks to prevent improper deposits and encroachments, maintenance of harbor-line markings, supervision and inspection of work of sand dredges, inspection of work being done under department permits, and examination and study of drawings submitted with applications for permits were continued.

A public hearing in connection with a proposed bridge of the commissioners of Allegheny County, between Braeburn and Natrona, Pa., was held August 17, 1915. Photographs of bridges between Aspinwall and Natrona were taken for use at public hearing in the matter of the raising of low bridges over the river at Pittsburgh. The reestablishment of certain triangulation stations in the vicinity of Nadine, about 2 miles above Lock 2, was commenced. Upon the request of this office wash piles left in the river near the Oakmont Bridge were removed by the offending parties.

The wreck of a steamboat was removed by the owners from the river near right bank near Squaw Run in pool 2.

Seven permits were issued by the department during the year, classified as follows: Crib and intake pipe, 1; wire crossing, 1; pipe lines, 2; ice breakers, 1; bridge reconstruction, 1; and new bridge, 1. The last two permits were granted, respectively, to the Pittsburgh, Bessemer & Lake Erie Railroad for the reconstruction of its bridge at Cheswick, Pa., and to the commissioners of Allegheny County, Pa., for a bridge between Braeburn and Natrona.

AMOUNTS EXPENDED UNDER ALLOTMENTS FROM ACTS OF JULY 5, 1884, AND
MAR. 3, 1909.

Fiscal year ending June 30—

1903 (part)-----	\$5, 233. 62
1904-----	16, 204. 93
1905-----	27, 235. 94
1906-----	26, 462. 52
1907-----	82, 998. 35
1908-----	61, 574. 98
1909-----	37, 839. 51
1910-----	46, 639. 83
1911-----	30, 874. 84
1912-----	34, 100. 58
1913-----	41, 475. 28
1914-----	43, 331. 55
1915-----	33, 874. 79
1916-----	42, 991. 99
Total-----	530, 838. 66

Statement of expenditures for operating and care of locks and dams, Allegheny River, during the fiscal year 1916.

Salaries and wages of regular hired-labor force-----	\$28, 043. 44
Miscellaneous supplies and services-----	3, 356. 10
Miscellaneous repairs-----	11, 592. 45
Total-----	42, 991. 99

COMMERCIAL STATISTICS.

Lockages made and traffic passed at Allegheny River locks during the calendar year ending Dec. 31, 1915.

Item.	Designation.	Lock 1.	Lock 2.	Lock 3.	Total.
Lockages.....	Number..	2,246	2,383	1,131	5,760
Steamboats.....	do.....	3,032	865	147	4,044
Coal boats, barges, flats, and boat bottoms.....	do.....	3,184	4,889	583	8,656
Rafts.....	do.....	4	8	2	9
Other craft.....	do.....		2,536	1,554	4,090
Coal.....	Tons.....	271,680	10,520	1,792	283,992
Barges (new).....	do.....		1,020	1,470	2,490
Flats (new).....	do.....			288	288
Other iron or steel products.....	do.....	50		208	258
Sand.....	do.....	56,580	222,318	20,508	299,406
Gravel.....	do.....	110,358	265,167	12,422	387,947
Stone.....	do.....	96			96
New dock pieces.....	do.....		50		50
Timber.....	do.....	1,014	303	275	1,592
Lumber.....	do.....	1,830	1,298	1,080	4,198
Pit posts.....	do.....	4,850	4,970	4,395	14,215
Mine braces.....	do.....	200	200	220	620
Railroad ties.....	do.....	400			400
Tanbark.....	do.....		81	81	162
General merchandise.....	do.....	176	281	60	467
Pit ties.....	do.....			266	266
Boat bottoms.....	do.....	1,728	2,088	2,124	5,940
Total tonnage.....		448,982	508,246	45,164	1,002,372
Passengers.....	Number..	6,608	8,147	4,680	19,435

6. OHIO RIVER ABOVE STEUBENVILLE, OHIO.

For report on Locks and Dams 7, 9, and 10, Ohio River, see report on improvement of Ohio River by construction of locks and dams, pages 2733 to 2740.

7. HARBOR AT PITTSBURGH, PA.

Maintenance.—The channels in the harbor were in good condition during the year. Conditions for the handling of craft in the harbor were improved by the removal of material by private parties as follows:

	Cubic yards.
Sand and gravel.....	199,075
Waste material removed from sewer bars and loaded on cars.....	4,930
Waste material removed from landings, tipples, etc., and deposited at foot of Neville Island, Ohio River.....	6,273
Waste material removed from landings, tipples, etc., and deposited along upper side of Dam 2, Monongahela River.....	16,000
Total.....	226,278

Inspection.—River and bank patrol was continued throughout the year to prevent improper deposits, and examinations were made of work on banks to prevent encroachments beyond the harbor lines. The supervision of the work of sand dredges was continued. Nine dredges, owned by three companies, were operated under department permits. In a number of cases it was necessary to require the dredge owners to remove wash piles which were left in the river in violation of the conditions of the permit. The ultimate effect of work of the sand dredges is such that channel conditions are materially improved.

Examinations were made of work being done under department permits.

The gasoline launch *Luzon* was used for inspection and survey work until March 29, when it was replaced by the steamer *Kittanning*, which will also be used for towing purposes.

In compliance with requests of other engineer officers 5,200 tons of iron, steel, etc., fabricated in the Pittsburgh district, were inspected by employees of this office.

Permits.—Examination and study of drawings submitted with applications for permits were continued. During the year in this district 59 permits for miscellaneous structures were granted by the department, of which 11 were in the Pittsburgh Harbor, classified as follows: Cable and wire crossings, 5; roadway, 1; walls and dredging, 2; overhead traveling crane, 1; piling, 1; bridge, 1. The bridge permit mentioned above is to the Baltimore & Ohio Railroad Co. for the reconstruction of its bridge, known as the Pittsburgh Junction Railroad bridge, across the Allegheny River at Thirty-third Street, 2.7 miles above the mouth of the river.

The Ohio Connecting Railroad Co. completed the reconstruction of its bridge over the main and back channels of the Ohio River at Brunot Island. Final inspection was made of the reconstruction of the Baltimore & Ohio Railroad bridge over the Monongahela River at Glenwood, Pa. In response to a request of the commissioners of Allegheny County, a rehearing on the application for approval of plans of the highway bridge over the Ohio River at McKees Rocks was held July 9, 1915. On December 2, 1915, and January 25 and 26, February 1, 2, and 4, 1916 a public hearing was held in the matter of the raising of low Allegheny River bridges, at which arguments for and against the raising of the bridges were heard. Considerable field and office work was done in connection with the preparation of necessary data for this hearing. Report was submitted to the department June 14, 1916.

Local surveys, soundings, and maintenance of harbor-line marks.—In this district supervision is exercised over harbor lines on both banks of the rivers, as follows: Allegheny River, 24 miles; Monongahela River, 69 miles; and Ohio River, 28 miles; a total of 117 miles, of which 27 miles are in the Pittsburgh Harbor. Harbor lines were marked on the ground on the right bank of the Monongahela River at Riverton for a distance of 400 feet, and on the right bank, back channel, Neville Island, opposite Groveton, for a distance of 500 feet.

Triangulation stations, disturbed during the reconstruction of the Northside Point bridge over the Allegheny River, were reestablished.

An examination was made and cross sections were taken of the wharf on the left bank of the Allegheny River between Barbeau and Ninth Streets.

Soundings were made for about 1,000 feet above Dam 1, Allegheny River, to determine if there were any obstructions above level of lock sill, and also at numerous landings and tipples where scraping had been done by permission of the district officer.

For use at the public hearing in the matter of the raising of the low bridges over the Allegheny River grades of present bridges and new grades of raised streets in their vicinity were determined in the field.

A field examination was made in connection with the proposed work of the Carnegie Steel Co. at Braddock as affecting certain triangulation stations of the harbor-line survey.

Removal of snags, wrecks, etc., Monongahela River.—A sunken flat was removed from the channel opposite Hazelwood Avenue, Pittsburgh, and three snags from the channel between the Panhandle Railroad and Tenth Street Bridges.

APPROPRIATIONS.

Mar. 3, 1899	\$110,662.90
June 13, 1902	10,000.00
June 13, 1902 (allotment June 14, 1904)	5,000.00
Mar. 3, 1905	10,000.00
Mar. 2, 1907	10,000.00
Mar. 3, 1909 (allotment Mar. 17, 1909)	4,000.00
June 25, 1910	5,000.00
Feb. 27, 1911	5,000.00
July 25, 1912	5,000.00
Mar. 4, 1913	5,000.00
Oct. 2, 1914	2,500.00
Mar. 4, 1915	7,500.00
July 27, 1916	2,500.00
Total	182,162.90
Received from other sources:	
Sale of steamboat <i>Loma</i> on Treasury certificate of transfer settlement, Nov. 23, 1906	\$4,000.00
Sale of blue prints	107.59
Sale of condemned property	5.16
	4,112.75
Total	186,275.65

COMMERCIAL STATISTICS.

Classified statement of river traffic in Pittsburgh Harbor for calendar year 1915.

Items.	Short tons.	Ton-miles.	Value.
Acid	28,800	408,960	
Barges:			
Steel	2,190	45,990	\$219,000
Wood	2,724	84,444	135,200
Boats, steam	900	12,600	180,000
Boat bottoms	2,068	64,728	91,872
Billets, steel	129,333	1,463,274	2,909,992
Cement	153	61	1,071
Clay products	1,000	200	3,200
Coal	9,989,102	185,797,297	19,978,204
Gravel	1,113,507	12,970,518	453,008
Iron and steel products	26,179	294,159	1,306,980
Kegs, empty	1,200	13,200	72,000
Live stock, horses	75	1,500	27,000
Lumber, sawed	7,679	185,832	158,580
Machinery	11	22	1,100
Machinery, general	24,682	140,687	1,861,180
Mine braces	200	6,160	500
Miscellaneous	1,290	6,400	128,000
Molasses	1,437	4,371	145,700
Pit posts	4,970	153,078	12,922
Sand	1,183,838	11,334,065	473,535
Stone	1,153	18,620	1,153
Tanbark	81	405	972
Timber, not sawed	828	11,592	8,280
Waste material	80,525	563,675	12,079
Total	12,622,955	213,583,951	28,109,463

Total passengers, 704,000.

Average value per ton, \$2.23.

Average distance transported in harbor, 16.9 miles.

The greater part of the coal, sand, and gravel originates outside the harbor. The coal is transported an average distance of 21 miles and the sand and gravel 8 miles before entering the harbor.

A packet line operating one boat between Pittsburgh and Greensboro, Pa., on the Monongahela River, was established during the year.

The following table gives the number and classes of vessels engaged in freight and passenger traffic during the year:

Steam stern-wheel towboats.....	71
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8. YOUGHIOGHENY RIVER, PA.

No project funds were available. The expense incident to the following operations was charged to examinations, surveys, and contingencies—inspection of streams and to maintenance and improvement of existing river and harbor works—preliminary examinations:

Banks were patrolled to prevent improper deposits and encroachments, examination and study of drawings submitted with applications for permits, and inspection of work being done under authorized permits were continued.

Four permits for bank fills and one for a pump house and intake were issued by the department.

In compliance with a provision of the river and harbor act of March 4, 1915, a report on a preliminary examination of the river up to West Newton, Pa., was made and forwarded to the department October 25, 1915.

APPROPRIATION.

June 25, 1910.....	\$100,000.00
Amount withdrawn for reallocation for improving Ohio River below Pittsburgh, Pa., river and harbor act Mar. 4, 1915.....	87,805.25
Net total.....	12,194.75

COMMERCIAL STATISTICS.

Articles.	Short tons.	Ton-miles.	Value.
Coal.....	91,661	130,036	\$178,322
Sand.....	23,895	11,946	9,558
Gravel.....	20,445	10,223	8,173
Waste dredged material.....	38,000	9,500	5,700
Total.....	174,001	161,705	206,753

Average value per ton, \$1.19.

Average distance transported on Youghiogheny River, 0.93 mile.

All this commerce is on a reach of 2 miles above the mouth of the river, which is affected by pool 2, Monongahela River.

The coal originates on the Monongahela River and is transported an average distance of 70 miles, while the sand and gravel are transported an average distance of 30 miles from the Ohio River.

FINDING LIST.

SHOWING THE SUBDIVISIONS OF THIS REPORT BY DISTRICTS.

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